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USSR Report

MILITARY AFFAIRS

No. 1823

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MILITARY-POLITICAL ISSUES

PARTY LIFE: ELECTIONS, REPORTS

Moscow KRASNAYA ZVEZDA in Russian 19 Oct 83 p 2

[Article by Lt Col A. Karpatov: "Party Life: Reports and Elections: Called Upon to Set the Tone"]

[Text] During final problems officers of the district staff and political directorate carefully inspected the artillerymen's combat schooling and political training and the status of equipment, weapons and the training facility. Its results naturally were given special attention at the report-election meeting of party members of the regimental headquarters held immediately after the inspection.

Party organization bureau secretary Capt M. Chernikhovskiy, who gave the accountability report, said with satisfaction that the regiment fulfilled pledges in competition. Many officers of the unit staff also received high grades in almost all disciplines. Among them were A. Staroverov, A. Kovalyuk, A. Yershov, V. Cheboksarov, I. Statuyev, O. Zhosan and others.

And so the training year is ending and much success has been achieved, but just what is most striking in the party members' mood and in the atmosphere of their party collective? The orientation on work is even more determined, with a desire to connect and fuse it integrally with the accomplishment of general party tasks. It is not by chance, no matter what the party members spoke about and no matter what issue they were discussing, that the focus of their attention consisted of recent party documents and the evaluations, conclusions and directions contained therein. The statement by Comrade Yu. V. Andropov published on 28 September orients party members on vigorous work to explain to soldiers all the acuteness of today's international situation and imperialism's aggressive politics, on instilling vigilance in the personnel and mobilizing them to attain new successes in strengthening combat readiness. Resolutions of the November 1982 CPSU Central Committee Plenum became a starting point in a more decisive struggle to improve efficiency and discipline and perfect leadership methods and work style. Materials of this year's June plenum provided an impetus to improve the ideological work of the party organization. All this today consists of reference points in daily work and a yardstick, if it can be thus expressed, of what has been done and of what must be done. What is important is that the people perceive their special position in the regimental party collective, for they are staff party members who head up key sectors. That means their party organization is called upon to set the tone in an innovative approach to accomplishing all tasks.

The accent was placed on this both in the report and in presentations at the report-election party meeting.

Here, for example, is what Lt Col A. Staroverov said.

"We must continue," he said, "to synchronize our work daily with high party demands. The staff officer for whom party spirit is connected integrally with deep professional competency and who sincerely roots for his own sector of work, and not just his own, by his own example already awakens energy, an intolerance for deficiencies and initiative in colleagues..."

It would appear that these words can relate fully to Maj V. Cheboksarov. He arrived in the unit a year ago and without even shaking the road dust off, as they say, he immediately joined actively in the collective's affairs. "Our 1st Battalion always has achieved good results," he was told by the commander. "But I sense that some officers there have become self-complacent. They have to be stirred up."

And Vladimir Mikhaylovich "stirred" them up. Although as deputy regimental commander he had many things to do, he tried to visit the battalion as often as possible. Together with its commander, Maj L. Dobryanskiy, he introduced a number of new methods techniques in the artillerymen's training which allow attaining the teams' cohesiveness faster and not only the fulfillment but the bettering of operational training norms, and together they made conditions for performing the task more complicated in order to fill the training with the breath of modern combat.

The very same fervent, selfless concern for the regiment's combat readiness and for creation of all conditions for productive training of the personnel is typical of party member Lt Col A. Yershov. The renovated barracks and other facilities, the refurbished enlisted men's mess which now probably more resembles a city coffeehouse, the improved appearance of the military post and the doubled kitchen farm all were accomplished this year at his initiative and with his very active participation.

Party Member Yershov has the feature of being able to "elevate to a principle," as the officers say among themselves, any instance of unconscientious attitude toward the job or unfinished work. For example, he will notice worn-out boots or a threadbare or ill-fitting uniform on a soldier and he will have a talk with the soldier's superiors without fail about inattention to people and that this cannot be tolerated among party members.

Staff party members constantly kept their focus on problems of maintaining high combat readiness and firm military discipline and they displayed exactingness toward subordinates. Speaking about this in the accountability report, the party bureau noted at the same time that strict demands alone are not enough. It is necessary for organizational measures to be backed up by extensive indoctrinational work and a strengthening of party influence.

It must be emphasized that this is a very true thought. Just by virtue of his official position it is easy for a staff officer to be carried away only by

administrative measures and to attain outwardly effective and rapid successes, but are they firm?

Regarding the motor transport service, for example, the regiment issued many strict orders and punished those guilty of poor equipment upkeep and overexpenditure of fuel. Order was restored for some time, especially prior to the arrival of commissions and senior officers, but then the deficiencies resurfaced.

They are present even now, as discussed frankly at the meeting by Lt Col A. Staroverov, Maj F. Novobrodskiy and other party members. And the reasons? The primary one lies in the improper work style of party member Officer A. Maksimov, chief of the motor transport service. Outwardly he is diligent, busy from morning until late evening and tries to remedy gaps in his rather vast area of responsibility, but he usually does this alone, doesn't rely on his assistants, doesn't try to resolve problems which arise through a close unity of organizational and indoctrinational measures and through people's awareness, and relies on peremptory shouting and punishments.

The fact is, however, that people of a particular collective are not united around a position but around a leader who is able to organize their work, make them enthusiastic and inspire them; one who is able to rely on party and Komsomol activists and on subordinates' initiative. Maj Maksimov, however, is not distinguished by closeness to people, very rarely attends party and Komsomol meetings in the subunits and is passive in ideological indoctrination work.

Capt Yu. Dubina, Maj V. Zhovtnyy and Sr Lt S. Ivankov, who are staff party organization members, still are participating poorly in this work. But one can't establish authority, charge people with energy, initiative and a firm belief in successful accomplishment of difficult tasks or get any kind of new idea from them with a "telephone" style of leadership and occasional "forays" to the subunits.

The following issue of vital importance also was raised at the meeting, and particularly in the presentations of Lt Col A. Yershov and Maj V. Norikov. A regimental staff officer as a rule is a specialist very knowledgeable in his work who, moreover, while visiting various subunits, is able to compare forms and methods of personnel training and indoctrination and the organization of socialist competition. Who if not he is to actively work to spread foremost experience?

Many party members of the staff party organization do this. Lt Col A. Staroverov made no small contribution to the noticeable professional growth of young battery commanders lieutenants O. Khmarskiy and Yu. Mal'tsev. Aleksandr Nikolayevich constantly watches the young officers' development and shares with them both his own experience and how the best battery commanders are arranging training and performing indoctrination of subordinates.

But there are examples of another sort. For example, Capt A. Anisimov often fights for effective economy of fuels and lubricants, more active explanatory

work among personnel in this area and dissemination of the best drivers' experience at meetings of staff party members. But what participation did he himself take in disseminating foremost experience? Almost none.

The work style, leadership methods and participation of party members in political indoctrination work are issues which naturally held a dominant place at the report-election meeting. And the party members drew a spirited conclusion, backed up in the party meeting resolution: Show more imagination and initiative in the work and each person in the assigned area must actively influence a further reinforcement of discipline and an improvement in vigilance and combat readiness.

6904
CSO: 1801/080

SCIENTIFIC RESEARCH INSTITUTE OF JET PROPULSION CELEBRATES 50 YEARS

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 21 Sep 83 p 4

/Article by Ya. Golovanov, former engineer RNII /Scientific Research Institute of Jet Propulsion/, KOMSOMOL'SKAYA PRAVDA scientific reviewer; "Handmade Lightning: Today the Scientific Research Institute of Jet Propulsion is 50 Years Old"/

/Text/ September 1933 was particularly difficult for him. Preparation was going on to the utmost for maneuvers of the Baltic Fleet which he had to command. The building of the balloon "SSSR" was coming to an end, but all the same it was necessary to help. He had the chairmanship in a governmental commission for investigating the reasons of the death, in an aviation disaster, of the director of the Main Administration of the Aviation Industry, P. I. Baranov. It was his sacred duty to the memory of Petr Ionovich, a bright, remarkable man. In September he replaced K. Ye. Voroshilov, and temporarily fulfilled the duties of People's Commissar of the Army and Navy (now they would have called him the USSR Minister of Defense). All military affairs were in it. There were also Frenchmen here: they charged him to accept and accompany (since he freely spoke French) a delegation headed by Minister Pierre Cote. The French were interested in aviation. He led them to TsAGI (Central Aero-Hydrodynamics Institute), an experienced aviation factory. Twenty-one September had passed. On the aerodrome everything was of the highest order. The orchestra burst forth so that it seemed like golden leaves circled in the sky, not because of autumn but because of the "Marseillaise." He always carefully studied the dynamics striking him and leading to the incredible perfection of the guard of honor. Returning from the aerodrome to the people's commissariat, he quickly entered the office, opened the document case "For Signature," glanced at the first page and smiled, "At last." That for which he had so long struggled had been accomplished: on the form of the Revolutioanry Military Soviet was printed order No 0113, the order about the organization of the Scientific Research Institute of Jet Propulsion (RNII). He dipped a pen into the cut-glass inkwell and joyfully signed, "M. TUKHACHEVSKIY."

This was exactly 50 years ago.

Mikhail Nikolayevich Tukhachevskiy was one of few military leaders of high rank who immediately believed in rockets. He never argued about the significance of the experience of the Civil War for future wars, never belittled the glories

of valiant cavalry attacks, but always and everywhere fought for the radical technical re-equipping of the army. In 1931-1932 in a fundamental work, "New Questions of War," still prior to launching our first rocket, he was already underscoring: "Extremely secretively, but intensively, work is being conducted to create a jet propulsion motor." "For artillery," noted Tukhachevskiy, "a jet propelled engine creates unlimited possibilities to hurl artillery shells of any power and to any distance during simultaneous significant simplification of artillery systems and reduced firing." He wrote to I. V. Stalin and K. Ye. Voroshilov, to the SNK /Council of People's Commissars/, STO /Council of Labor and Defense/, and to the Society for Assistance to the Defense Aviation and Chemical Industries, pressing the importance of rocket research, trying to convince them that "the most rapid organization of a broad scientific and experimental base for continuing this most important work, in the form of a Jet Propulsion Institute, is necessary." RNII was for Tukhachevskiy not simply a new military scientific research center, even though the first and only one in the world, it was not a bureaucratic affiliation that was important to him (so much so that very soon RNII was transferred by Sergo Ordzhonikidze to the People's Commissariat of Heavy Industry), but a practical realization of mature ideas for equipping the army of the future, an army which sooner or later (he knew this and spoke directly about it) would have to enter into a skirmish with fascism, a terrible and ruthless skirmish.

RNII combined two of the more efficient, and already proving this efficiency, collectives: the Leningrad Gas Dynamics Laboratory (GDL), at the head of which was Ivan Terent'yevich Kleymenov, appointed as the first director of RNII, and the Moscow Group for the Study of Jet Propulsion (GIRD), directed by Sergey Pavlovich Korolev--he was appointed as Kleymenov's deputy. Later, Korolev was replaced in that post by Georgiy Erikhovich Langemak--an engineer-artilleryman, the designer of the rocket missile based on a smokeless, slowly-burning powder. RNII gathered together the leading missile men of the country, the future academicians and laureates, those whom we call pioneers of rocket technology and cosmonautics: S. P. Korolev, V. P. Glushko, M. K. Tikhonravov, Yu. A. Pobedonostsev. Noted engineers worked here: designer of cruise missiles, Ye. S. Shchetinkov, and solid-fuel rockets, L. E. Swartz; creator of the first device for controlling rockets in flight, N. S. Pivovarov; researcher of rocket fuels, N. G. Chernyshov; creator of rocket boosters, facilitating the takeoff of heavily-loaded bombers, V. I. Dudakov; and master of solid fuel missiles, V. A. Artem'yev--talented, and more important, people infinitely devoted to their work.

It is impossible to enumerate all that has been done in half a century: just the selected works of the institute, published for specialists, and therefore the most strict and short-spoken in their language, comprise eight volumes. This is the work not of hundreds, but thousands of people. In all the various themes, the genuine novelty and innovative judgments already distinguished the first years of RNII.

Namely here, the rocket plane "RP-318-I"--the first sign of future jet-propelled and rocket aviation--was designed by S. P. Korolev, outfitted with a liquid-fueled rocket engine by V. P. Glushko, and tested by V. P. Federov in flight. Namely here, L. S. Dushkin built a rocket engine--everywhere perfect for its

time--which A. Ya. Bereznyak and A. M. Isayev installed in their fighter-interceptor "BI," and G. Ya. Bakhchivandzhi reported that his fantastic "flame" mahince could fly. Finally, namely here, within the walls of RNII, was designed, constructed, and tested the legendary "Katyusha"--indisputably the most prominent weapon of the Second World War, in large part determining the success of the Soviet Army on its fields of battle.

More than once an argument was heard about who was considered the true creator of the multi-charge jet propulsion arrangement. In these arguments the surnames of people everywhere, having a distant or administratively formal relationship to this research often were named, and others, really active workers, were undeservedly forgotten. It is diffiuclt to distribute, as the saying goes, "to everyone in equal measure," but the main thing is the way the question itself is put seems incorrect to me. The "Katyusha" did not have an individual creator, its creator was GDL and RNII. There could be no individual creator, because the problem in building the "Katyusha" was a complex problem, underlying which was not an open, not an illuminated, but a long and difficult path to perfection.

At the same time, both gunpowder and gunpowder rockets were invented and used in far ancient times. Hundreds of designs of various machines and devices for aimed launch of these rockets were known. Even the experience of serial production and military application of rocket weapons existed for which we were obliged first of all to our countrymen Generals A. D. Zasyadko, K. A. Shil'der, and K. I. Konstantinov. Yes, everything would have been like this, but everything was noted by a grievous stamp of imperfection that allowed tube artillery to prevail over rocket artillery. This imperfection gradually determined, and slowly strengthened a skeptical attitude of the military towards rockets just as to weapons in general, which, suffice it to say, was preserved by the artillermen right up to the first volley of "Katyushas." Chief Marshal of Artillery N. N. Voronov wrote of this in his memoirs. This partly accounts for the fact that rockets, created in RNII, were first successfully used during battles in Khalkhin-Gol, not by ground forces, but by aviation, free from old artillery traditions.

During the testing of aerial rocket shells on one of the firing ranges in the vicinity of Moscow, in the presence of senior military leaders, People's Commissar Voroshilov asked Kleymenov:

"What's going well for you in the rockets?"

"There is this gunpowder which is absolutely harmless to handle," replied the director of RNII, and he handed the marshal a powder charge. Then he turned to Langemak and said quietly, "Georgiy Erikhovich, give me some matches."

A light stirring occurred in the dense formation of those surrounding the People's Commissar for Military Affairs. Langemak lit the charge. The powder in Kleymenov's hand burned evenly with a light crackling.

"Just don't set on fire comrade Budenniy's mustache," Voroshilov said happily.

I am writing about all this especially so that you understand the "Katyusha" was not only a scientific-technical, but also a psychological problem--this was a breaking of established notions, an encroaching on the authorities, and an overcoming of ambitions, this was a drama of human possions.

The positions of the missilemen were really vulnerable. Solid fuel projectiles, which N. I. Tikhomirov, V. A. Artem'yev, and later B. S. Petropavlovskiy and G. E. Langemak had started to develop in Leningrad, still had to be "taught" to fly--it was necessary to stabilize them in flight, to organize a slow, even, and steady burning of powder charges, and to standardize their production so that one projectile in no way differed from another. Only in this way could one count on an effective firing. The first 100-200 projectiles of 28 and 132 millimeters were manufactured soon after the organizing of RNII in Moscow. But it was soon discovered that with a small fin assembly the projectiles started to turn topsy-turvey in the air, and further increasing their weight shortened the range of the firing. The search for a golden mean went on long and persistently.

In resolving one problem others arose. The launch platform, what must it be? How does one make it so that the projectile, sliding along the launch rail, does not jam? What length should the launch rail be? A short one lowers the accuracy, a long one adds weight to the launcher. How does one mount all this design on a truck? Similar questions were very many.

In October 1938, the design was developed for a 24-projectile launcher in which the launch rack was secured perpendicular to the axis of a truck--the "Katyusha" fired as if "sideways." In the firing tests in December 1938, and February 1939, it turned out that spurts of hot gasses scorched the truck. Besides that, during firing the "ZIS-5 started to sway, the shot group was terrible, and the necessary range also was not achieved. Again gradual, well thought out perfection was demanded in all links, meticulous eradication of the small mistakes which add up to a big mistake. But already at these tests the main thing was brought to light and settled with documentation: "...the idea of firing a large number of rockets was undoubtedly correct and timely...." With the appropriate constructive mounting, the automatic rocket launcher will represent a powerful means of artillery attack."

There was no one, not a single engineer in the world who could prompt this "appropriate constructive design"--it was a completely new affair.

And again they "brought in" a projectile, searched for new diaphragms and igniters, introduced dual ignition, changed duraluminum stabilizers for steel, and designed a new launch rack. If it is placed along the axis of the more powerful three-axle "ZIS-6," 24 projectiles can be accomodated. The design of a new 16-projectile launch rack was approved by the technical council of the institute in April 1939, in August it was manufactured, and in September it was accepted for range testing. Could one "creator" or even a group of "creators" accomplish such a hugh amount of work in such a period of time? No, of course not. Tens of people created the "Katyusha." In the summer and fall of 1940, six of the first BM-13 launchers were manufactured in the institute--combat vehicles with 13.2 centimeter-caliber projectiles.

On 17 June 1941, People's Commissar of Defense, Marshal S. K. Timoshenko, People's Commissar of Armament D. F. Ustinov, People's Commissar of Ammunition B. L. Vannikov, Marshal S. M. Budenniy, and Chief of the General Staff, General of the Army G. K. Zhukov were present during the combat testing of the BM-13 in Tushin, and later--in the outskirts of Moscow. On Saturday, 21 June, leaders of the party and government examined the combat vehicle. The decision was made to develop their serial production and form a special rocket military unit.

In these minutes the commanders of the "Junkers" with swastikas on their tails were stowing in their map cases plans of Odessa, Sevastopol, Kiev, Minsk, and Riga. The last hours of our peaceful lives were running low.

On "Red Square" of the institute today stands a BM-13, a gift of the Guards mortar men to RNII.

"Yes, that real front weapon, itself," said Popov. He touched the tubular construction with his hand, like cavalrymen pat the withers of their horses.

As quite a young engineer, Aleksandr Sergeyevich Popov came to RNII 50 years ago. For participating in the creation of the aerial rocket weapon the 28-year old designer was honored with the Stalin Prize. He worked a great deal on the "Katyusha"--he designed the 24-projectile self-propelled mount, and perfected the design of the launch rails.

"On the evening of 28 June they summoned me to the institute and said that together with engineer Dmitriy Aleksandrovich Shitov"--he was engaged with projectiles--"we were ordered to the front to teach the personnel of the first battery to shoot. Captain Flerov, having completed the first course of the Academy imeni F. E. Dzerzhinskiy a week before this, was named the battery commander. He was young, but already a battle-tested fighting man; he had taken part in the Finnish Campaign. They selected the soldiers very strictly; the weapon was considered top secret. I remember that there were Muscovites in our battery, people from Gorky, lads from Chuvash. We had our own technical unit, medical unit, refuel point, and mess hall. All together there were seven combat vehicles. With them were 50 trucks with projectiles and yet about a hundred in the transport train. Everything happened so urgently that I didn't receive a military outfit, and left for the front in a suit. One day I walked away just a bit from the battery; they arrested me. Flerov rescued me; he said that I was not a spy. Shitov and I conducted activities with the troops "by ear"--it was forbidden to write anything, and these activities mainly came off as practical training: loading, aiming, unloading. They cultivated automatism in the sequence of actions of the military crew."

"On the night of 1-2 July, we left Moscow on the Minsk highway. On the Borodino field the troops took an oath: not to give the enemy the new military equipment under any circumstances. After the first bombing, an order came to move only at night, to stay in the forest by day. On 9 July, we occupied a position near the town of Borisov, and awaited battle. On the night of 12-13 July, they summoned us by an alarm and we left for Orsh. At the station at Orsh, many German troop trains with troops, equipment, ammunition and fuel had been

gathered. We deployed the battery about 5-6 kilometers from the station behind a hill. They did not throttle down the vehicle engines, in order to take cover instantly after firing. It was a clear, sunny, and warm day. At 1515 hours, 14 July 1941, Captain Flerov gave the command to open fire. In 7-8 seconds we fired 122 projectiles. The railroad junction was obliterated from the face of the earth; for 7 days there was no one there. Later I fought with the second battery near Yartsevo. Rokossovskiy was present during the rocket volley. He told me, 'Thank you. Give my regards to your collective.'"

"Thus was born the 'Katyusha.'"

The heirs of the glorious traditions of RNII in the postwar years became well-known Soviet scientists at the head of whom was academician Mstislav Vsevolodovich Keldysh: academicians V. S. Avduyevskiy, A. M. Lyul'ka, G. I. Petrov, L. I. Sedov, G. P. Svishchev, G. G. Chernyy, associate members of the USSR Academy of Science G. N. Babakin, A. P. Vanichev, V. M. Iyevlev, B. V. Raushenbakh, and others. In partiuclar, in the collectives directed by them, and also in the laboratories of the institute, research was conducted on various conditions of launching interplanetary automatic stations in the atmospheres of Venus and Mars, and instruments were created to analyze their atmospheres: the composition, gravity according to altitude, illumination and wind speed on the surface; variants of soft landings on lunar soil of various density were analyzed, general recommendations for heat protection of launched cosmic apparatus were worked out; a wide circle of research was conducted of prospective power plants for cosmonauts' needs.

Today is the anniversary, but a work day--an ordinary work day, and at 9 o'clock in the morning a stream of people, like a river to the turbine, rotate the turnstiles in the passageways: the fellow-workers of the institute hurry to the writing tables, Kuhlman drafting tables, EVM (electronic computers), and consoles of the test benches. Congratulations on your birthday dear comrades, and on your overall glorious 50th anniversary! You are not spoiled with popularity, you seldom wear your decorations and still more seldom tell about your work even to your close friends. You are invisible, like a lunar crater is invisible from Earth, named in honor of your institute, the crater RNII. Truly, there are not so many institutes in the world for whom lunar craters are named. You have earned this honor.

12198
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COMMANDERS, PARTY AGENCIES RESPONSIBLE FOR MONITORING VALUES

Moscow KRASNAYA ZVEZDA in Russian 20 Oct 83 p 4

[Article by Col V. Beloshitskiy, Group of Soviet Forces in Germany: "On a Troubling Matter: A Prestige Purchase"]

[Text] Recently one of my acquaintances attended a bride-show, as he said. People were offered a look at the "Madonna," an elegant service for which the owners had been in line for more than one month, registered regularly, often asking for time off from work, and even argued with someone. "Now that's it. Now they probably don't need anything else," said my acquaintance summing up the labors of the happy possessors of the marvel with mother-of-pearl hues. "Perhaps only the little elephants..." "What elephants?" I asked, not understanding right away. "Well, those seven that at one time were the limit of dreams of the ancestors of today's petty bourgeoisie."

His words provided a new impetus for reflection, as they say, about a phenomenon which I too had noticed among a certain circle of persons. Only wasn't the diagnosis of petty bourgeoisie posed too strictly? People wish to live better and surround themselves with convenient, beautiful things. Is this bad? For example, is it possible to argue with the fact that it is much more pleasant to drink tea from those same cups of the service than from aluminum mugs? The more so as Soviet citizens are gaining more and more opportunities to live comfortably.

Nevertheless, I believe the irony in my acquaintance's words was apropos, for it is not at all a matter of the thing itself, but in the attitude toward it and toward the process of acquiring it, and in the means used to do so. It seems to me that there is a certain moral limit to every specific situation which is impossible to cross without risking being in contradiction with our ideas about individual dignity.

Let's say a person calls a friend in another city and asks him to look for a rare medicine, or a fur coat for a child, or even a water faucet which for some reason cannot be purchased locally. It is understandable that all this easily fits within our ideas of ordinary everyday cares. But another new settler obtains the cherished faucet at the nearest construction site. Another mother outbids for a turn in a children's clothing store. Now the moral feeling of course cannot help but be disturbing. And I am sure that nothing, even the need for medicine for a close person, can justify a bribe.

Just why does the natural desire for beauty, comfort and other blessings in life turn into a force capable of ignoring everything in some persons? I believe there are many reasons, but the most important are a callousness and an absence in people of other higher interests and an active position in life. The fact is that one has to be so taken up in a search for a new prestige acquisition as to devote one's entire leisure time to it, invent all kinds of "moves" and not forget about this even at work. How much must one not respect himself in order to argue with someone over a turn for acquiring that same "Madonna"? How must one regard society and the rules and laws established in it so as not to reckon with them?

I don't know what kind of things "absolutely necessary in life" the Baraniy couple had in mind, but something prompted Maj A. Baraniy who, by the way, held a rather high post, to set up his wife by hook and crook in work at a laboratory located 200 km from their place of residence. It is clear that the woman didn't plan to work, but needed the position only to augment the family budget, which even so was not that meager.

Again and again I reread materials of the June 1983 CPSU Central Committee Plenum. They don't contain even a line which wouldn't prompt to serious reflection and decisive action in the interests of our society's further development and the overcoming of existing shortcomings. We really achieved much, including in the indoctrination of people and as a matter of fact no one except party members ever set for themselves such an elevated goal as the shaping of an ideologically persuaded, harmoniously developed, spiritually rich individual who is building life according to the laws of social justice, reason, good and beauty. But it is also true that we have no basis for self-complacency since as we advance there constantly appear not only opportunities for comprehensive development of the individual, but also demands on him on society's part.

And who specifically must present these demands in each individual case? Under our Army conditions it is the commanders, political agencies, party organizations and women's councils, but each of us party members also cannot remove from himself concern for the culture of our everyday life, for the moral maturing of those around us and for the moral microclimate on our posts.

For now, though, it is not always that way. As it was later learned, even the intentions of that same Maj Baraniy to arrange work for his wife "without work" were no secret for those around him. But their condescending nature or, more precisely, lack of principle with respect to others' "weaknesses" led to an appointed person's open abuse of his official position. It is similar to my acquaintance who attended the bride-show of the ill-starred "Madonna." He assessed the situation correctly but expressed his position not in the presence of others, but behind the scenes as it were so as not to spoil relations. It was to no purpose.

6904
CSO: 1801/080

RESULTS OF TRAINING YEAR SUMMARIZED

Improved Training Methodology Required

Moscow KRASNAYA ZVEZDA in Russian 19 Oct 83 p 2

[Article by Lt Col A. Pavlov: "Strict Rhythm"]

[Text] It was the start of the training year. The subunit commanded by Major N. Yazikov, having made a major stride forward, took over first place in competition. Frankly, we had not expected this, but it was a happy surprise. The fact that this success had come to Major Yazikov, a hard working officer, experienced in training and educating troops, was in general not at all surprising. We expected it from him. But of course we could not count on success being achieved in such a short period of time. As a result we appreciated all the more the merits of this subunit commander.

But after some time Major Yazikov's subordinates demonstrated poor results at the comprehensive training exercises. An accident? Unfortunately, that is how we evaluated this failure. And we sounded the alarm only after the specialists from this subunit failed to shine.

Staff officers and members of the unit's methodology council worked for several days in the subunit. The organization of the training process and of independent training officers was analyzed in detail. It became clear that the subunit commander, relying on the experience and independence of several officers, slackened his demands upon them at the same time that they began to step up the pace of training junior specialists. Serious omissions in training and exercises were permitted due to haste. Frequently it turned out that a specialist, having been inaccurate one day, repeated his inaccuracy at the next exercise. "That is trivial," explained one crew commander, "we will polish it up later. But right now the main thing is to achieve high speed in accomplishing the operation."

It would be untrue to say that the subunit commander alone is to blame for this. We knew about his concept--to speed up the entry of junior specialists. And we approved of this proposal in general. But it is as if it hypnotized us. We clearly saw all the "pros" and did not notice a single "con." The "con" was that the necessary conditions for implementing this on the whole sensible proposal in the subunit had not yet been developed. The subunit commander and

crew commanders began to step up training of junior specialists without taking care to see that the training methodology was correspondingly improved.

This incident forced us to think about many things. Do we always support people's enthusiasm with able organizational work? Say, for example, that innovators are improving the training material base. This is a vital real world task. Applying a bandaid, as is said, is not enough here. Nor is it enough to develop attachments for simulators. It is necessary to modernize electronic systems and control panels. Work in this direction has already begun. But thus far the planned systems exist only on paper.

These and other "sore subjects" were brought up for discussion at the party meeting. An enthusiastic and businesslike discussion ensued, during which numerous valuable suggestions were made. They were made because on the eve of the meeting members of the party bureau conducted preparatory work. They met with junior specialists and listened to their wishes, and later the proposals of training exercise leaders and innovators. In this way not only were specific aims outlined, but also the means to achieve them. Much attention was paid to improving the methods of training junior specialists and organizing competition among them. Now I have the pleasure of naming young officers S. Ponomarev, V. Teplov, N. Bochkarev and V. Mironov, who successfully mastered their duties quickly and are showing good results in carrying them out.

Work aimed at improving the training material base was also successful. The rationalizers acted according to a precise plan, which provided for sequential modification of control panels. Therefore, no difficulties arose during exercises due to the fact that part of an apparatus was disassembled.

At the same time we were faced with new problems, At some point it was noticed that some specialists were lagging in carrying out their duties. Having investigated each such incident in detail, the staff came to the conclusion that the tempo of work had cooled down in those who in their daily activity had "forgotten" about their obligations for some time, and were not thinking about the fact that successes in fulfilling these obligations bear directly on the overall results of the subunit and the entire unit.

The laggards were talked to individually. Then subunit conferences and party and komsomol meetings were held. All of this was done with one goal: to let each individual again think about his plans, weigh everything properly, calculate and outline corrective measures and report to his comrades. The main objective was achieved: people felt deeply their involvement in each aspect of the collective obligations and their personal responsibility for their fulfillment.

In the future the full creativity of our commanders and political officers was demonstrated. For example, the experience of Major P. Traykovskiy was instructive. Like everywhere, obligations were adopted for the training period in the subunit which he commands. But simultaneously a schedule for implementing them was outlined. This made it possible to see specifically what each specialist had to do during one or another interval of time.

The day in this subunit begins with reports about how the missilemen had worked the day before. A brief analysis of the primary indices is given and the state of discipline is evaluated. The best crews are named. Later, when summarizing the month's results, all this will be considered and placed "on the scales" in order to determine those who deserve the rotational pennants, prizes and other incentives. The day's winners are discussed in the radio news, and special showcases and news bulletins are devoted to them.

Improving control over fulfillment of obligations have noticeable results. The spirit of competition burned more brightly and people's initiative and activeness improved. It is also important that now we can detect the slightest breaks in the rhythym of combat training and competition at any moment, and can take necessary corrective measures.

But we did not stop at this. On one occasion Major Yu. Lysenko, one of our best instructors, expressed the thought at a staff meeting about the need to improve the practice of summarizing results. He said it is time to organize planning training for commanders. Some of the officers did not support this suggestion. They tried to show that there is no sense in specially teaching the art of summarizing results. Every sergeant and junior officer sees and hears how his immediate supervisor does this. The latter in turn regularly is present at critiques conducted at subunit level. That, they say, is how they must gain experience.

However, Major Yu. Lysenko's arguments were more convincing. He recalled that certain questions are examined in a crew and others in a subunit, while a unit has its own specific interests. Therefore, there is not and cannot be any single plan for summarizing results.

Practice confirmed the correctness of this conclusion. Thus, in one subunit outwardly everything appeared satisfactory. Results were summarized at the established intervals. Leaders and laggards were named and fulfillment of socialist obligations was discussed. But the main thing was missing: the reasons for failures were not revealed and the "secrets" of competition leaders were not analyzed. Lt S. Ponomarev was asked how much time he spends per month preparing to summarize results, and he answered, "about two or three days."

In another subunit Captain A. Dobrovol'skiy answered the same question: "I prepare all month, collecting information every day and noting down the most important things." Therefore, the discussion about combat training and fulfilling obligations is always businesslike and specific. The officer structures his report so that every missileman receives an exhaustive evaluation of his work, supported by facts. And it is clear to all what must be done to eliminate shortcomings and who can be taken as an example.

Soon the methodology council supplemented the existing methodology for summarizing results with the experience of leading commanders who are very knowledgeable in the art of analysis. Today all the sergeants, warrant officers and officers in the unit are successfully using this training aid.

During the past year we solved the most varied problems. This work taught us a great deal. Among other things we are especially sensitive to the importance of already thinking about final results at the time that the goal is being outlined. If a solution is well reasoned, tasks are determined precisely, dates for their fulfillment are established and people are informed about the solution in detail and in a timely manner, they will undoubtedly respond with creativity and initiative.

I will cite the following example. During the winter training period we examined at one of the duty conferences the question of training high class specialists. This question had been discussed before but was not completely resolved. The main reason, as it later became clear to us, was that we had not studied the problem in detail and had avoided the rough edges and difficult aspects. The steps taken were "everyday," and since there was no pressure put on from above the desired results were not achieved.

As a result, taught as they say by bitter experience, we acted differently. First we studied the situation in leading collectives where the experience of master specialists was being ably used in training high class specialists. In this regard, the help of senior comrades is not episodic but constant in nature. Transfer of experience goes on not only during exercises and training classes, but during the hours of independent study. It is precisely here that the most difficult questions are broached and operational variants are played through via hypothetical inputs.

When this experience was passed on to everyone, there was no longer any need for anyone to be urged. Work turned out well since everyone had a clear understanding not only of the goal but also of how it was to be achieved. Indices of the military improvement of the junior specialists began to improve, as they say, before our eyes. Of course, we still have numerous weak areas and shortcomings in our work. Some soldiers are working at below their capabilities and young officers at times have insufficient creativity and initiative in organizing the training process. We view our priority task as to analyze shortcomings; to exactingly, strictly and fittingly evaluate everything new and advanced, born of the creative thought of commanders and political officers; and to introduce advanced experience into practice. I believe that this approach will help our personnel achieve still greater successes in the new training year in increasing combat readiness and strengthening discipline and organization.

Technical Training of Officers Stressed

Moscow KRASNAYA ZVEZDA in Russian 21 Oct 83 p 2

[Article by Guards Lt Col B. Dyukov, Group of Soviet Forces, Germany: "An Officer's Technical Ability"]

[Text] I recall a live firing tactical exercise. The regiment had completed a march in anticipation of a meeting engagement. At the line of probable encounter [rubezh veroyatnoy vstrechi] with the "enemy" the lead battalion joined battle with superior forces of the opposing side. At the same time

reconnaissance reported that the "enemy" was moving a tank column of up to battalion strength up from the depth.

The decision was as follows: strike from the flank and knock the "enemy" from the favorable line which he occupies before the approach of his tank column.

The success of this concept was determined by rapidity of maneuver, swiftness of attack and accuracy of fire. There was no time to spare. In addition to everything else the terrain was filled with ravines and swampy lowlands; in short, with nearly impassable sectors.

Guards Captain V. Kudinov, commander of the first battalion, checked the route on the map and said firmly:

"We will succeed. The equipment will not let us down. I have confidence in our drivers."

The battalion accomplished the mission. It reached the start line on time and fired with great accuracy, hitting the target with the first rounds at maximum distance.

However, later, during the offensive in the depth of the "enemy" defense, something happened which nearly cancelled out the achievements of the previous stages of the exercises. Before the onset of darkness, several companies had to complete a jump forward and seize a crossing toward which the "enemy" was already sending his reserves. Then it was discovered that the fuel tanks were empty. A critical situation had developed. Fortunately, helicopters helped out. They delivered fuel, and the tankers forestalled the enemy and occupied the crossing.

Among those at fault, first should be named Guards Captain V. Parkhomuk, chief of the regiment's POL [petroleum, oils and lubricants] service. It became clear that his knowledge of tactical norms was weak, and that he had incorrectly calculated the amount of fuel which was required to accomplish the mission. But behind this fact the inadequate technical competence of several staff officers could also be seen.

At the beginning of the training year the regiment headquarters and the party committee headed by Guards Major M. Pakhomov carefully studied the obligations which the officers had undertaken to raise their level of technical ability. Reports of several communists were heard at the party committee session about how they were working to broaden their technical knowledge. Dangerous symptoms were detected in some people. As it turned out, some commanders did not consider it necessary to become deeply involved in the fine points of the arrangement and operating principles of tank systems and mechanisms, or to study various possible malfunctions.

This opinion is fundamentally erroneous as experience has proven repeatedly. I recall that at the beginning of the training year one of the companies went to the moving target gunnery range for firing practice. They had checked the

the equipment the day before and everything was operable. Suddenly it was found that the sight attachment of one of the tanks was not working. It could not fire. It was necessary to eliminate the malfunction and return the weapon to normal action, but neither the tank commander nor Guards Lt S. Rankov, the platoon commander, could do this. Guards Major A. Makarov, deputy battalion commander for technical matters, went to the range. Soon everything was corrected. It turned out that the attachment had simply been incorrectly hooked up. In this instance it was fixed up with the loss of several hours of training time. But what would such an oversight lead to in battle?

It goes without saying that it is not an easy task to master modern equipment. Solving this task requires a comprehensive approach. Classroom instruction and practical exercises on the equipment play a most important role. Of course, a great deal depends on the effectiveness of officers' independent study and their participation in technical and firing conferences. While using all these forms of technical training, we emphasized the qualitative aspect of the question and improving technical training conducted in combination with tactical training. Guards Lt Col N. Mel', deputy regiment commander; Guards Major V. Putyrskiy, regiment chief of staff; Guards Lt Col A. Finogin, deputy regiment commander for armaments, and the battalion commanders did a great deal toward this end. We oriented all the officers toward studying equipment not only in the vehicle park and in classes, but also on the moving target gunnery range, the tank training area, and the firing range, during the course of firing and driving.

What are specific features of such training? First of all, norms for technical training and operation related to work on the equipment are accomplished in the field, against a specific tactical background, in a situation approximating that of combat.

For example, in the company commanded by Guards Sr Lt N. Glushchenko, three training positions are organized for technical training exercises. At one the soldiers conduct a general inspection of a tank and "top off" its systems and assemblies with fuel, oil and special fluids. At another the students work on technical training norms. At the third they work on the weapons. The training leader and the leaders at the training positions introduce such hypothetical situations as: "The 'enemy' is conducting intensive fire and a track has been damaged. Replace the damaged individual track sections and put the track back on." Or, "A tank has gotten stuck. Free the tank yourself with the aid of a log." All this is done under "enemy" fire, simulated by explosive charges and firing. The crews operate as in battle, using terrain cover and concealment, improvised materials, and only those instruments found in the vehicle.

Individual tasks for officers on developing short technical training meetings and technological charts for checking the tank's systems and mechanisms, and finding and eliminating malfunctions have become widely used.

For example, Guards Major A. Makarov, deputy battalion commander for technical matters, has done some useful work. He prepared a schematic diagram for checking the most important and difficult electronic circuits of a tank's

armament. Having such a diagram the crew can independently and quickly determine where the electronic circuit has been disrupted. They can not only identify but independently eliminate the malfunction.

When the winter training period ended, the staff and party committee analyzed the officers' fulfillment of their obligations, including raising their class qualification category. According to the figures, things seemingly were about normal--27 percent raised their category. But in order for the number of specialists in the regiment who have raised their category to reach 70 percent by year's end, as we planned in the obligations, diligent and persistent effort still lay ahead. Most important was to improve the effectiveness and quality of training and more productively use the training equipment, especially the simulators.

We began to prepare the schedule of activities in the subunits so that each officer had the opportunity daily to work either on the training simulators or directly on the equipment. A number of demonstrations and classes for the officers were planned and conducted, having the goal of arming commanders, especially junior ones, with that technical minimum of knowledge which would enable them to independently conduct lessons with their subordinates.

And there was yet another innovation which permitted the plans for combat and political training to be more closely linked with the competitive obligations. In preparing the schedule of activities we try to arrange for the competing subunits to go to firing and driver training at the same time. As a rule such training is more competitive and consequently more effective.

I would like to emphasize that organizational work which is aimed at improving the quality of commanders' training is accompanied by increased exactingness toward officers for their professional growth and fulfillment of obligations. It must be confessed that the technical ability of some officers is below present requirements.

We made such complaints, for example, about Guards lieutenants S. Renkov and S. Slotin. Our exactingness was beneficial; both raised their class categories.

The search for more effective ways of using combat and maneuver capabilities of weapons and equipment is more effective with a creative and inquiring approach to these questions. The obligations accepted by the officers were aimed at such an approach, and the struggle to fulfill them brought good results.

Take, for example, Guards Lt Col V. Galkin, chief of regiment artillery. He set himself the task of setting up a small arms range closer to the headquarters, so that one could go there at any time of day, and in so doing to see that officers' firing and fire control training was conducted unconditionally. It was a difficult task requiring considerable creative efforts. But Communist Galkin successfully accomplished it. With the assistance of Guards Sr Lt A. Grigorash and Guards Lt A. Akimov he set up a training facility in an empty basement. Currently artillery officers are

successfully working out questions of firing and fire control on an electrified miniature range.

Today most of the regiment's officers have become higher class category specialists. In the battalion commanded by Guards Captain Kudinov, 95 percent of the officers have raised their class category. They have fulfilled their socialist obligations overall and in technical training specifically. But even higher results can be achieved. For example, I believe that the regiment commander and all of his deputies and battalion commanders can and should become masters, and the company commanders and their deputies for technical matters should become specialists first class. So far we have not achieved this, although we have come close. Most (but not all) deputy regiment commanders are masters. The battalion commanders and their deputies for technical matters are specialists 1st class, as are 80 percent of the company commanders and their deputies for technical matters.

"A higher level of mastery of the new equipment!" This is the vital requirement of the day. We are proud of our remarkable equipment which, in able hands, is truly capable of miracles. We give a heartfelt thanks to its creators. We understand how important it is that this pride be transformed into deeds; into a high level of combat skill.

9069
CSO: 1801/76

INADEQUACIES EVIDENT IN TACTICAL TRAINING

Moscow KRASNAYA ZVEZDA in Russian 19 Oct 83 p 1

[Article by KRASNAYA ZVEZDA correspondent Lt Col G. Ivanov, Red Banner Central Asian Military District: "From Final Problems: Exactingness was Lacking"]

[Text] The squadron commanded by Maj K. Titkov was assigned the mission of delivering a bombing strike against a target and hitting "enemy" air defense weapons by cannon fire. The aircraft took off and then came the squadron commander's report over the air:

"Target sighted. Request permission to work."

The range flight controller Lt Col Ye. Peredera granted permission and then the warplane flown by Maj Titkov dashed swiftly above the target field and executed an energetic maneuver after releasing bombs. The result of the bombing soon became known but alas, the grade proved lower than expected. The bombs dropped by the squadron commander's wingman, Sr Lt V. Kurkovskiy, were even farther from the target. It was difficult to believe that first class pilots from an outstanding squadron were operating in the air.

Some time later Capt V. Gogolev attacked a ground target from an advanced kind of maneuver. Tongues of cannon fire flashed but the aircraft was still diving. Then the pilot finally began to place the craft in a horizontal attitude. Intense silence fell at the tower. Everyone, comparing the radius of maneuver with the decreasing distance to the ground, mentally asked himself the question: "Will the pilot be able to come out of the dive?"

He did. Leaving a trail of dark smoke behind, the warplane swept above the ground and dissolved in the blue.

"In your opinion, at what altitude did the pilot take the aircraft out of the dive?" I asked the general observing the aviators' actions.

After thinking he uttered:

"I believe it was below that permissible."

Later Sr Lt V. Kupenko, chief of the objective monitoring team, clarified the flight parameters of Capt Gogolev's aircraft and confirmed this thought. The inspector prohibited flight operations since the squadron aviators had not fulfilled requirements guaranteeing safety.

Just why was the squadron unprepared for tactical work at the range? I talked with Maj Titkov about this.

"The pilots very much wanted to show high results in tactical application," said the squadron commander, "but some were not able to overcome excessive psychological stress, and so we made mistakes."

Yes, as prescribed, the situation in the tactical flying exercise was distinguished by intensity and dynamism, but the fact is the aviators were preparing for operations in difficult situations throughout the entire summer training period. If the nerves of some of them faltered in the inspection, this meant there was a weak place in the training and indoctrination methodology.

When this was said to Maj Titkov he responded that they allegedly did not merit rebuke as the squadron was foremost and several times had been declared best in the regiment. By the way, this viewpoint also was shared by some officers who were leaders one level higher.

The subunit's combat readiness unquestionably rose during the year and several pilots raised class ratings, but does this really provide the basis for self-complacency? Life convinces us that stopping in tactical improvement means falling behind the times.

Let's try to arrange scattered facts in a logical chain and comprehend the reasons for the failure which the squadron experienced in the final inspection.

Back at the beginning of the training year Maj Titkov's subordinate Capt A. Paramonov passed over the far beacon on a landing approach considerably below prescribed altitude. This was classed as a precondition for a flying incident. During that month squadron pilots also made other mistakes in flying techniques. Just what conclusions were drawn? Practically none.

We know that flight parameters are registered by on-board objective monitoring equipment. Commanders and instructors are obligated to analyze aviators' work in the air thoroughly based on these data. But (and here is a curious feature) they did not identify one of the mistakes with the help of flight recorders. It was only members of the flight control group who reported the pilots' mistakes. It turns out the objective monitoring films were not studied promptly.

Not noticing a mistake in time and not evaluating it fundamentally means contributing to its repetition, and it is not far from a mistake to a disaster. In addition, a pilot who has come to believe in his infallibility and impunity gradually reduces demands on himself on the ground and in the air.

Much was said at the monthly summary of socialist competition results in the air regiment and at official conferences about the need to increase demands on

subordinates by commanders and instructors, but in practice the state of affairs changed little for the better. It is not surprising that mistakes and violations were repeated from month to month. For example, after the incident with Capt Paramonov, Capt A. Chekanin descended to low altitude in the flying zone and dashingly passed over a residential area.

Only after this did the instructors begin to analyze objective monitoring data more carefully and identify deviations, but unfortunately the matter often was limited to this. Each squadron has a log where even the most insignificant mistakes and deficiencies in pilots' actions in the air are to be entered. Minor features permit judging the development of an aviator's flying style and making necessary corrections. Often, however, the mistakes identified were not entered in this log, which naturally hindered their prevention.

As the facts indicate, some pilots' professional growth went slowly and the training level did not always correspond to the class rating. This is shown for example by a mistake made by second class military pilot Sr Lt V. Krot. The officer felt himself so tense and constrained in the air that he forgot to change the wing geometry as prescribed prior to an attack on a ground target.

Subunit party organizations struggled insufficiently actively to ensure flight safety. For example, the question of assuring accidentfree flight operation was not directly discussed once in the party organization where Party Member V. Zubkov is secretary. The regimental party committee also lacked proper diligence. One party committee session, for example, recommended that subunit party organizations hear accounts from appointed persons about their personal contribution to ensuring flight safety, but the party committee did not set specific dates and the businesslike recommendations remained unfulfilled. Certain other decisions also remained on paper.

"Now we draw up specific, effective measures of party influence on those who violate flight laws," the party committee secretary assured me.

I would like to believe that is how it will be. It is only a pity that it comes only at the end of the training year.

6904
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MILITARY EDUCATIONAL FACILITIES

TACTICAL TRAINING PROBLEMS IN MILITARY COLLEGES DISCUSSED

Moscow KRASNAYA ZVEZDA in Russian 20 Oct 83 p 1

[Editorial: no author, city listed]

[Text] The development of the Soviet Armed Forced, the increase in their technical equipment and the growing demands for combat readiness in units and ships make it incumbent on military schools to tirelessly improve the quality of officer cadre training. Lesson plans, programs and teaching methods are being improved and the relationship between military training institutions and the troops and navy is being strengthened. Military schools see to it that each of their students has wide political views, solid general science, engineering and military technical knowledge, practical skills and can train and educate subordinates. Tactical and specialty training have their own role in the professional development of future officers.

Tactical and specialty training in military school programs has increased in recent years. The number of exercises conducted in the field, in airports and at sea has increased and more time is spent on the cadets' military probation. It is important to wisely use every academic hour.

Success is greatest where tactical training missions are resolved in a comprehensive manner, with the inherent combination of modern equipment and weapons expertise, specialized subjects and where the results are evaluated against the strict measure of battle. The field opinion is that good tactical training takes place in the Moscow Officer Training School imeni RSFSR Supreme Soviet and the Tashkent Armour Officer Training School imeni Twice Hero of the Soviet Union Marshall of Armoured Forces P.S. Rybalko. In these schools modern field training centers are established, exercises are full of norms and are conducted under near-battle conditions.

At the Chernigov Pilot Officer Training School imeni Leninist Komsomol, they are skillfully instructing the cadets on the methods of individual and group aerial battle, the basics of organizing and conducting electronic warfare, how to defeat enemy ADA and tactics allowing them to effectively use modern aviational battle systems. Valuable experience in using tactial trainers is being compiled in the Naval Officer Training School imeni M.V. Frunze. The cadets of this and other naval schools are learning a great deal on their path to military ships.

However there are still many omissions and unresolved problems in the tactical training of future officers. Not all the graduates of combined arms, tank and artillery schools really know the requirements in accordance with the regulations which define the conduct of modern battle, the combat capabilities of mutually-supporting elements, their weapons and equipment. At times the development of young pilots is delayed because of shortcomings in practicing group flying and tactial application at the school. Several graduates of naval schools were also lacking practical skills.

Combat readiness in units and ships requires that shortcomings in field, aerial and sea training of military school graduates be absolutely eliminated. The development of an officer as a tactician and combat operations planner is unthinkable without the in-depth study of the priceless experience gained in the Great Patriotic War and the mastery of the Soviet science of winning which was forged in battle and proven in strict tests. It is important that cadet theoretical training inherently merge with the practical aspects.

Further improving the organization of cadet army and shipboard probation is important. Future officers must be sent to forward units and to the best ships in the full swing of military training, at the right stage of tactical and specialty studies, field firing and missile launching. The probationers must not only absorb the knowledge but also must feel the mental and physical tension experienced by the commander, the political officer, military engineer or technician while under battle conditions.

It takes a highly qualified instructor in love with his subject to train a mature tactician. Commanders of schools, political organizations and heads of departments are urged to look for the improvement of instructor specialty knowledge and methodological skills and the introduction of modern achievements in military training, psychology and advanced military experience into the training process. They must completely and qualitatively implement command training plans which are regulated in detail by the appropriate regulations and must introduce the schedule of professional-instructor corps probationers into the force and the fleet.

The department of tactics has an important role in educating future officers of high command quality. It is worth noting that this department is able to resolve this complicated task through a close interrelationship with other departments, commanders and political workers of cadet units. Perfecting tactical skills is a many-faceted process. While organizing field exercises an officer uses knowledge gained by studying various disciplines. The more he masters Marxist-Leninist theory and scientific methodology, which helps to recognize the nature of modern battle and to clearly see the perspectives of military affairs, the more successful his command activity.

Political agencies, Party and komsomol organizations must fight using their inherent methods to improve tactical training. Their mission is to inculcate in the instructors and the commanders of cadet units the acute feeling of personal responsibility for developing high moral-fighting qualities in future officers and to instill in the instructor association a regard for the new and advanced and an irreconcilability for the indulgent and simplified.

The armed forces and the navy expect military schools to provide ideologically tempered, tactically proficient, resolute officers able to resolve complex missions, to work with people and to train and indoctrinate subordinates. Training such a military cadre is an important contribution to the combat readiness of units and ships and raises the defensive capability of the Motherland to an even higher level.

12511
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IMPORTANCE OF SELECTING RIGHT INSTRUCTORS NOTED

Moscow KRASNAYA ZVEZDA in Russian 23 Oct 83 p 2

[Article: "Set Requirements for Instructors", under the heading "Problems of Preparing Military Cadres", by Lt Gen V. Bryukhov, chief of administration, Main Cadres Directorate of the USSR Ministry of Defense]

[Text] Take any memoirs of Soviet military leaders and commanders off the book shelf and you will find in practically every one of them pages dedicated to the professors and instructors of military academies and schools and words of gratitude to them. And this is natural. It is difficult even to imagine an officer who would recall his school years and those who generously gave him knowledge without emotion.

Careful instrucor selection and constant skill improvement is a primary link in resolving the task which the Party has assigned to institutions of higher learning, including military schools.

As stressed at the June 1983 CPSU Central Committee Plenum, the demands placed on instructors is growing. An instructor's ideological conviction and thorough subject knowledge must be combined with a pure teaching talent and the ability to captivate people, to find the individual approach to each student. One must have a calling to become a real educator.

Where do military schools find their instructors? There are basically two sources: those officers from the field with the inclination to instruct and graduates of military post-graduate studies. The instructor who comes to the schools and academies from the field introduces field sense and practicality to the academic staff. Graduates from military post-graduate work have their individual merits. They primarily have the ability to combine training-educating and scientific work. A mutual enrichment takes place and this fosters the constant improvement of the training and educating process and strengthens the atmosphere of high demands and comradely support in the VUZ [Institute of Higher Learning].

While instructing others, the instructor must constantly expand and refresh his own knowledge. This is why a famous professor began his opening lecture with the works, "Today we are beginning together a new academic year. For you this is the first, for me, the fortieth". But there is little advanced

general science and specialized training for those elevated to the faculty. Can you imagine a teacher without highly cultured speech or skillful language ability? Even diction is an important feature. It takes experience to notice that a person has the inclination to be a teacher and a careful evaluation of all the "pros" and "cons" is necessary before recommending someone as an instructor. Who sets the tone in the search for the deserving? Primarily the institutions and academies themselves.

A little more than ten years ago, LTC A. Silant'yev completed the Ryazan Airborne Officer Training School imeni Leninist Komsomol. During his cadet years the instructors noticed his ability to get to the root of a problem, to share his knowledge and to speak intelligibly and clearly about complicated issues. They remembered the graduate and followed his assignment to the field. Silant'yev successfully commanded a platoon, company and battalion and was awarded the Order of the Red Star for courage during international duty. Presently, LTC A. Silant'yev is teaching tactics at the institution from which he graduated.

Of course, instructing abilities are more clearly displayed at the right level of maturity. Academy and school representatives must go on temporary detached duty to search first hand during probationary training, exercises and maneuvers. This is the way the Moscow Combined Arms Officer Training School imeni RSFSR Supreme Soviet found instructors for its weapons and marksman faculties--Col V. Zhuravlev and LTC V. Konyaev. Zhuravlev commanded a tank battalion and was decorated with the order "For Service to the Motherland in the Armed Forces of the USSR" Third Class for successes in training and educating subordinates and mastering new equipment. He graduated from the military academy. LTC Konyaev came to his instructor position from duty as a regimental chief of staff. He was promoted ahead of time twice. There is certainly reason for people at the school thinking that these officers not only know well the subjects they are instructing, but more important, they are able to teach cadets by personal example and with their own biographies. The hopes were justified.

I bring up this subject also to say a good word to commanders and political workers who have held capable officers in the field. Unfortunately school initiatives and the candidates personal desires to be an instructor have not been supported. Other heads are guided by immediate, local interests. Basically the incorrect opinion that a military educational institution is a dead-end in the service persists. I had the chance to remind one of the staffs that Marshalls of the Soviet Union A.M. Vasilevskiy, R.Yu. Malinovskiy and I. Kh. Bagramyan at one time were instructors in military academies. These positions helped them later to display their military leadership talents more distinctly and fully. If a gifted commander, political worker or military engineer with educational talents is added to a faculty, the end results is that the unit sending him to the VUZ and many others gain from this.

Carrying out the decision of the 26th CPSU Congress, the June (1983) CPSU Central Committee Plenum, Party and governmental resolutions on further developing senior schools and improving the quality of specialist training, the military councils, commanders, political and cadre organizations of all levels and categories are putting much attention on selecting instructors.

The painstaking study of the political, business and moral quality of candidates precedes promotion into instructor duty. Based on certification results and other information, the cadre officers of military regions develop a five-year, long-term study, officer cadre selection and preparation plans. These also include the number of instructors in military educational institutions.

All those cases where someone other than the best officers were recommended for instructor positions have not been eliminated. For example, not long ago Major V. Putyato was assigned as an instructor in the Poltava Signal Officer Training School. Before this he commanded a regiment and held a position which was within the competence of a trained, resolute officer. However Major V. Putyato did not justify the confidence at his assignment, allowed serious omissions in work and conducted himself poorly on a personal plane. His comrades who had recommended him to the institution had no reason to say that the officer has learned from what had occurred. Following their example they entrusted to this unqualified regimental commander a position where personal qualities and devotion to duty were especially important. Major Putyato didn't work out as instructor.

Cases of officers who had made mistakes being assigned to institutions took place in the Provolsk and Odessa military districts. These are plainly isolated examples, but they are intolerable in those places where the future of our officer corps is forged.

The development of officers for instructor positions requires time. Usually it takes a minimum of two or three years of intense work.

One can learn from the experiment with higher instructor qualifications which took place at the Armour Military Academy imeni Marshall of the Soviet Union R.Ya. Malinovskiy. Here new instructors from the field and second-year post-graduate military students underwent an introductory program. It lasted three months and totalled 120 hours of general academic methods of instruction, including 30 hours of exercies at the field educational center. The final two months were in the faculty. During this period trial exercises were conducted. For three months the instructors passed exams on operational-tactical, special and methodological training and depending on their results they were allowed independent work with students. They continued studies in a so-called program of development planned to last 3-5 years. Program completion is to coincide (and in many cases does) with the defense of a candidate's dissertation.

A topical approach to improving the professional skills of instructors gives good results. The majority of young instructors at the academy successfully completed their duties.

The significance of military probation, participation in exercises and regular lessons in the system of command training for both new and experienced instructors is great. Unfortunately it must be said that in many schools the plans for sending instructors to courses, probation and exercises are too low without good reason. For example instructors at the Sumsk Artillery Officer Training School imeni M.V. Frunze and the Novocherkassk Signal Officer Training School imeni Marshall of the Soviet Union V.D. Sokolovskiy are seldom at exercises.

In a number of institutions in the command training system individual assignments are not planned and the lecture method prevails. Studies are designed without considering the level of officer education.

Time is placing an all the more complex mission on military schools, their professors and instructors. By advancing the best of the best to instructor positions and improving the education of the educators, we are looking after the further strengthening of the Motherland's defensive capabilities.

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NATO EXERCISE 'CARBINE FORTRESS' DESCRIBED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 7-12

[Article by Maj Gen I. Ivlev and Lt Col V. Viktorov: "'Carbine Fortress' Integrated Troop Exercise Of NATO's Central Army Group"]

[Text] Speaking at the June (1983) CPSU Central Committee Plenum, CPSU Central Committee General Secretary Comrade Yu. V. Andropov noted in his speech that "the aggressiveness of ultrareactionary forces headed by U.S. imperialism has been growing dramatically. Attempts are being undertaken to turn development back at any price." Military preparations by the NATO countries have attained all-time records. Official representatives of these countries openly declare the possibility of conducting "limited," "protracted" and other variants of nuclear war. On one hand an attempt is being made to pacify the population of these states, and on the other hand to get it used to the idea that such war is acceptable.

These are precisely the goals that were pursued in numerous exercises of the combined and national armed forces of the North Atlantic bloc in the second half of 1982, during which its command worked out different variants of preparing to initiate and conduct a war, primarily a limited war (nuclear and nonnuclear), tested the combat readiness of the field forces, formations and units and studied the influence of changes in the organization and armament of both friendly troops and those of the probable enemy upon the possible nature of combat operations in individual theaters of military operations and in Europe as a whole. During this demonstration of force, up to 30 major troop and command-and-staff exercises were conducted with the participation of the bloc's combined and national armed forces. Up to 350,000 personnel, up to 4,000 tanks, more than 2,000 warplanes and over 300 warships took part in them. Even the Western press did not conceal the fact that most of the exercises were conducted near the borders of the Warsaw Pact countries.

"Carbine Fortress," an integrated two-sided exercise conducted in the second half of 1982 by troops of NATO's Army Group Center, became the largest operational and combat training measure within the framework of the "Autumn Forge-82" maneuvers. As is noted in the Western press, it embraced a vast area: Bamberg, Ansbach, Heidelberg and Fulda. Presence of a large quantity of rivers and other natural obstacles is typical of this locale. Its northwestern part is mountainous (with elevations up to 1,000 m) and covered with dense

forests. Therefore commanders of all ranks making decisions for combat had to account for the terrain features and utilize them both in offensive and in defensive operations.

According to the foreign press the ground troops were represented in the exercise by the staffs of three army corps, the units and subunits of five divisions and a separate armored regiment of the USA, the FRG's 12th Tank Division, a Canadian mechanized brigade, a Belgian motorized infantry battalion, a Luxembourg motorized infantry battalion and some combat and rear support units (subunits) of the regular armed forces and reserve components of the bloc countries. Air support was provided by NATO's combined air forces in the Central European theater of military operations, which were participating in exercise "Cold Fire-82." In all, 73,000 persons took part in "Carbine Fortress," and 5,000 armored vehicles including over 1,000 tanks, 16,000 other vehicles, about 1,000 warplanes and 500 helicopters were used in support of the ground troops. Direct leadership of the exercise was assigned to the American commander of Army Group Center, General F. Kroesen (this army group is presently under the command of General Otis).

The principal measures were reported in the Western press, and by radio and television. In this case the main emphasis was laid on demonstrating the so-called "Atlantic solidarity" of partners in the block to the public, and on persuading it of the need for raising the outlays of the member countries on militaristic goals and creating an atmosphere of military psychosis within the population of Western Europe. Speaking to reporters at a press conference, General Kroesen declared that the NATO command does not exclude the possibility of being the first to use nuclear and chemical weapons in a war with Warsaw Pact states. These words are being confirmed by practical deeds. Thus during the major exercises the bloc troops always work on the problems associated with actions taken by formations, units and subunits in the face of mass destruction weapons, and primarily their new forms (neutron ammunition, binary toxic agents) and the protective resources. Enormous assets are being spent on their creation.

It was reported in the foreign press that the main goal of the exercise was to test the combat capabilities of troops of different nationalities within the composition of Army Group Center (primarily the VII Army Corps) during joint actions with the air forces in operations of the initial period of war in the Central European theater of military operations. The plans of NATO strategists devote priority attention to this theater of military operations. In the estimation of foreign specialists, it is precisely here that the bloc's military-political leadership concentrated the most combat ready formations of the American, West German and English troops, outfitted with modern armament. In accordance with the bloc's long-term military program, this grouping is being subjected to measures foreseeing reequipment of the formations and units with more-powerful high-precision models of long-range weapons and their conversion to a new official organizational structure, which will make it possible to create NATO combined armed forces strike groupings capable of fulfilling offensive missions from the very first days of a war. For example, as a result of such reorganization, three out of four divisions in the FRG's I Army Corps are

tank divisions (previously there was only one such formation within its composition). That is, for practical purposes this has become a tank corps.

According to reports in the foreign press preparations for exercise "Carbine Fortress" were made long before it began, though they were most active in the course of 1982. Beside detailed development and refinement of the necessary documents, special tactical and combined-and-staff exercises, training sessions, courses of instruction and other measures requiring troop participation were organized. Thus at the beginning of the year the 3d and 8th mechanized divisions underwent troop exercises, and then the U.S. V and VII army corps participated in command-and-staff exercises. Courses of instruction were also provided for the exercise leadership and umpires. Special attention was turned to preparations for receiving units and subunits airlifted from the North American continent, to training reservists called up for active duty and to breaking in new subunits.

According to a statement by the command of Army Group Center, the two-sided exercise permitted the troops to acquire the experience of organizing and conducting offensive and defensive operations simultaneously with real troops representing a simulated enemy before them. In this case armored formations and units equipped with new M1 Abrams and Leopard-2 tanks made up the bulk of the offensive and counterattacking groupings.

The main attention was turned during "Carbine Fortress" to the following problems: refining the plans and testing the combat readiness of the units and subunits for their conversion from a peacetime to a wartime posture; reinforcing groupings of Army Group Center by airlifting troops from the USA and by partially mobilizing and deploying FRG units and subunits; checking out the march preparations and travel of the formations to predesignated areas of operations; conducting both offensive (including the forcing of water obstacles) and containment operations; coordinating attacking units, and ground troops in general with tactical aviation; gaining practical experience in the joint work of staffs of different nationalities; covert troop command and control; air defense and logistical support.

The problems associated with reinforcing Army Group Center were worked out on the background of a deteriorating international situation. Before the exercise, about 19,000 officers and soldiers were airlifted together with light armament by C-141 military airlift aircraft from the staffs of the III Army Corps, the 1st Mechanized Division, the 3d Separate Armored Cavalry Regiment, combat support and service subunits and army reserves. Heavy weapons, military equipment and logistical support resources were delivered aboard three marine cargo ships--the "Callaghan," the "Cygnus" and the "Comet." About 29,000 tons of various cargoes were unloaded from these ships within a day at Belgian and Dutch ports. The delivered military equipment and weapons were then carried by rail and by C-130 and C-160 military cargo aircraft to predesignated regions of combat operations. Some of the wheeled equipment was moved on its own power. Units and subunits arriving from the North American continent received combat equipment from storage depots in the FRG, they prepared this equipment for action, and they reconnoitered the terrain.

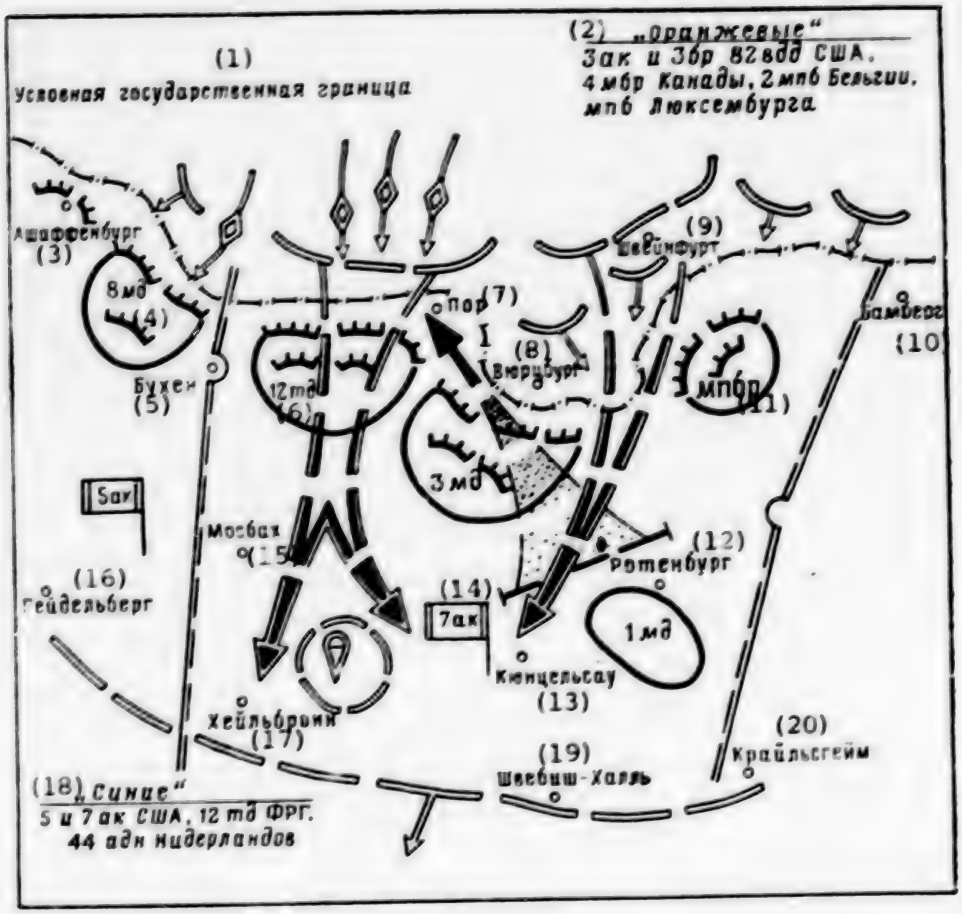

Figure 1. Plan of Operations of the Sides in Exercise "Carbine Fortress"

Key:

1. Arbitrary state boundary
2. "Orange": U.S. III Army Corps and 3d Brigade, 82d Airborne Division, Canadian 4th Mechanized Brigade, Belgian 2d Motorized Infantry Battalion, Luxembourg Motorized Infantry Battalion
3. Aschaffenburg
4. Mechanized Division
5. Buchen
6. Tank Division
7. Lohr
8. Wurtzburg
9. Schweinfurt
10. Bamberg
11. Motorized infantry brigade
12. Rothenburg
13. Kunzelsav
14. Army corps
15. Mosbach
16. Heidelberg
17. Heilbronn
18. "Blue": U.S. V and VII army corps, FRG 12th Tank Division, Dutch 44th Artillery Battalion
19. Schwabisch Hall
20. Crailsheim

An arbitrary state border passing through Aschaffenburg and Wurtzburg and then along the River Main was selected for combat operations in accordance with the exercise plan (Figure 1). "Orange" operated north of this border, and "Blue" (the NATO countries) operated south of it.

The traditional variant was used as the initial situation. "Orange" dramatically aggravated international relations, provoked disorder on the border, deployed its troop groupings in the border areas in short time under the guise of exercises and began dictating its conditions to individual countries on the "Blue" side, trying to force them to assume a neutral position. Then they "violated" the state border, and following air strikes, they conducted an offensive operation in order to capture "Blue's" forward line, destroy the main groupings in the first echelon and create conditions permitting their troops to penetrate into operational depth.

Implementing a number of political and diplomatic measures, and having persuaded itself of the inevitability of war, "Blue" began advancing its forward units to the border, so that the armed forces could be switched from a peacetime to a wartime posture quickly under their cover. In short time they advanced to their predesignated operational areas, and through active operations they tried to keep the enemy from breaching the forward line, after which they defeated "Orange" troops with counterthrusts by second echelons and reserves, and restored the situation on the "state border."

"Orange" was conditionally represented by a tank army consisting of four divisions, while its real composition was: from the USA--III Army Corps (Headquarters, 1st Armored Division, 3d Separate Armored Cavalry Regiment) and 3d Brigade, 82d Airborne Division; from Canada--4th Mechanized Brigade; from Belgium--2d Motorized Infantry Battalion; from Luxembourg--a motorized infantry battalion. "Blue" conditionally included the troops of Army Group Center and it was actually represented by: from the USA--V Army Corps (Headquarters and 8th Mechanized Division), VII Army Corps (Headquarters, 1st Mechanized Division, 3d Mechanized Division) and 3d Brigade, 82d Airborne Division (in the second half of the exercise), from the FRG--12th Tank Division, from Canada--4th Mechanized Brigade (in the second half) and from the Netherlands--44th Artillery Battalion.

In the first day that the combat operations were played out, following powerful air strikes and artillery fire, "Orange" "violated" the state border and, using its own crossing resources, forced the River Main. Making its main thrust with the 1st Armored Division in the general direction of Heilbronn, it intended to quickly surmount the zone occupied by the covering forces and penetrate the first defensive line, breaking through it on the move. The 3d Separate Armored Cavalry Regiment and the 4th Mechanized Brigade made an auxiliary thrust around Wurtzburg and in the direction of Kunzelsav. To maintain the high momentum of the offensive, "Orange" made extensive use of airborne tactical forces, and it capitalized on the terrain for maneuver of combat groups and fire. During actions in the zone of cover, forward detachments were allocated from the formations while the main forces moved in approach march formations, ready to commit to combat.

Northeast of Heilbronn, "Orange" dropped an airborne force by airplane (3d Brigade, 82d Airborne Division). Prior to this drop, the airborne force had flown nonstop from the USA to the exercise area. The commander of the airborne force received his concrete mission only 1.5 hours prior to the drop.

After annihilating important objectives in the indicated area, on the next day it had to capture a bridgehead on the bank of the River Neckar (southwest of Mosbach) and hold it until arrival of the main forces.

Owing to active operations and close coordination with aviation "Orange" managed to break into the "enemy's" defenses, and to capture the defense areas of first-echelon brigades by the end of the second day of the offensive on its right flank. Encountering stubborn resistance in other sectors, "Orange" advanced more slowly and suffered significant casualties (especially on the left flank, where Belgian subunits were operating). "Orange" subsequently enjoyed its greatest success in the sector of the main thrust, where the U.S. 1st Armored Division was attacking. Here it managed to penetrate in the "enemy's" disposition throughout the entire depth of the defenses of first-echelon divisions, but it no longer had sufficient reserves to exploit the breakthrough. During the operation its formations organized their combat formation in two echelons as a rule.

"Blue" was represented by the VII Army Corps, which was given the leading role in this militaristic game, jointly with the U.S. V Army Corps and an army corps of the FRG (it operated conditionally). The VII Army Corps was in the first echelon of Army Group Center in the sector of the "enemy's" main thrust. Its defense zone had a width of up to 100 km on the front, and it was about as deep. The combat formation was organized into a single echelon. The 1st Mechanized Division was placed into the reserve. During the initial phase, "Blue" pursued the goal of wearing down the first-echelon formations of "Orange" through aggressive containing and defensive actions, compel them to commit their main forces in the covering zone and, in the event of penetration of the forward edge of the defenses, to prevent their further advance with counterattacks by brigade and divisional reserves in certain sectors (Figure 2) [Figure not reproduced].

In the estimation of foreign military specialists, "Blue" troops operated aggressively in the covering zone and in battles to hold the forward defensive line, they maneuvered their forces and resources extensively, and they quickly laid minefields. Mixed groups containing AH-1 HueyCobra attack helicopters and A-10 attack aircraft were used effectively in tankable sectors.

"Blue's" actions were supported by tactical aviation. For example about 200 sorties were flown during the first day of the engagement in behalf of the VII Army Corps, of which 110 were flown for the purposes of close air support while the rest were flown to isolate the area of combat operations and conduct reconnaissance.

"Blue" made competent use of rough terrain and large (the rivers Main and Tauber) and small water obstacles to organize stubborn defenses, and it utilized folds in the terrain for covert maneuver of subunits into threatened sectors and for the landing of tactical airborne forces by helicopter. The new American UH-60 Black Hawk multipurpose helicopters were used for the first time for this purpose within the defense zone of the 3d Mechanized Division. Although "Blue's" troops withdrew 45-50 km in some sectors within 3 days,

in the estimation of foreign military specialists they did demonstrate effective use of weapons and combat equipment as well as an ability to conduct aggressive combat operations.

On the fourth day of the engagement, regrouping its forces and continuing to defend itself in certain sectors, "Blue" made a counterthrust in the direction of Rothenburg and Lohr with its main forces, consisting of the U.S. 1st and 3d mechanized divisions and the FRG 12th Tank Division. It dropped an airborne force in the vicinity of Gerolzhofen (this drop was made by a paratroop battalion of the 82d Airborne Division, which had been transferred to "Blue" by this time). The counterattacking grouping was so strong that by the end of the day it managed to push the "enemy" back 40-50 km, and to get close to the "state border" in some sectors.

According to the Western press, the FRG 12th Tank Division, which contained 15,000 men (of them, 8,000 soldiers had served 5-15 months and more than 2,000 had been called up from the ready reserves) operated especially successfully during the counterthrust. It is outfitted with modern combat equipment. Moreover 3,000 American servicemen were included in its composition for the period of the exericse.

In the following days of the offensive, "Blue" completed the destruction of the penetrating "enemy" grouping and restored the situation at the "state border." At this point the active phase of the exercise came to an end.

Analyzing the results of Army Group Center's troop exercise "Carbine Fortress," foreign military specialists note the main goals were achieved during it: improvement of the coordination of the work of the staffs, testing of the combat capabilities of ground troop units and subunits of the armed forces of several block countries in the course of a modern war, and further development of the problems associated with interaction with the FRG's territorial troops. The aggressive actions of the NATO troops supposedly confirmed that they are in a position to fulfill their missions in a war involving conventional weapons alone.

As in some other exercises, combat operations in this exercise began following a period of tension lasting up to a month, during which the NATO combined armed forces were placed at full alert. The most battleworthy grouping was created in the Central European theater of military operations and in the Blatic straits zone.

In preparation for the exercise, the main staffs and units of the "dual-based" troops and various support and service subunits were transferred first to FRG territory. For example the personnel of almost 70 subunits of the American regular troops, the National Guard and the reserves were acquainted with the conditions of the Central European theater of military operations.

It took 18 days to deliver combat equipment by sea and 7 hours to unload it at the ports, and it took 6 days to airlift personnel together with light armament. Two days were allocated to deployment of the arriving troops in the predesignated operational areas. The experience of exercise "Carbine Fortress" showed that

American reinforcements arriving in a time of military operations in Europe can be placed within the composition of NATO combine armed forces groupings within 5 days.

As is noted in the Western press, the plans of operational coordination, problems associated with supporting deployment of U.S. ground troops with the forces and resources of the FRG territorial troops, and the actions of brigades formed out of "special-purpose" troop subunits representing different national contingents with the goal of organizing sabotage in the enemy rear were practically tested and practiced for the first time on a broad scale.

During the process of troop command and control, the command and staff tried to quickly concentrate forces and resources in the decisive sectors, and to regroup and resubordinate formations and units in the course of combat operations. A tendency to conduct a large quantity of night battles was noted. Presence of night vision instruments in the troops made this possible.

The NATO command devoted a great deal of attention to practicing coordination of ground troops with tactical and army aviation. Airplanes of various types participating in an independent combined air forces exercise , "Cold Fire-82," used groups of 8-14 aircraft in close air support. They operated at heights of 90 to 300 m. A total of 100-200 sorties were flown per day in behalf of each first-echelon division. Jointly with other forces and resources, tactical aviation also completed the missions of attaining and maintaining air superiority, isolating the area of combat operations and conducting air reconnaissance.

Army aviation was represented primarily by West German BO-105P antitank helicopters and American AH-1 HueyCobra attack helicopters. The new American UH-60 Black Hawk multipurpose helicopters participated in an exercise in the European theater of war for the first time. Observation and communication helicopters were called in for reconnaissance and target spotting. Moreover army aviation was extensively employed to lay mines quickly in tankable sectors.

During the exercise, the foreign press emphasizes, much attention was devoted to working out the problems of troop logistical and medical support. Thus each day every division expended up to 500 tons of fuel, delivery of which required over 60 10-ton tankers. As far as medical support is concerned, the airlifting of casualties to the USA aboard transport aircraft was broadly employed.

During exercise "Carbine Fortress" about 2,500 cases of damages to the population of the FRG were recorded, for a total sum of up to 13.5 million marks. About 140 persons were hurt in 426 road accidents, and over 10 died.

The conduct of such large-scale exercises right at the borders of Warsaw Pact countries requires personnel of the Soviet Armed Forces to constantly raise their political alertness, their combat readiness and their field skills, so that together with soldiers of the fraternal countries of the socialist community they would be able to offer an annihilatory repulse to an aggressor at any moment.

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FRANCE SEEKS CLOSER TIES WITH NATO

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 13-17

[Article by Col Yu. Yerashov: "Dangerous Evolution of French Military Policy"]

[Text] In the realm of military development, the leadership of the French Socialist Party (FSP), which has been in power in the country for over 2 years, has accepted the policy of preceding bourgeois governments in general terms. It essentially rejected any sort of major sociopolitical changes in the armed forces, leaving the entire higher command at its posts. At the same time, certain dangerous changes have occurred in France's military political course.

In its election campaign, the socialist party did not spare any criticism of the military blocs. It was emphasized in the FSP's program document, "The Socialist Plan," that collective security and disarmament were at the core of its foreign policy. However, on coming to power the party leadership made a sharp turn in the direction of developing comprehensive and active cooperation with NATO and the USA, the aggressive course of which has dangerously complicated today's international relations, as we know. The pro-NATO, pro-American adjustment in the country's military policy is manifesting itself in many areas.

In the recent past, mutual relationships between France and NATO were limited, because in 1966, General de Gaulle, who was president at that time, took the country out of the military organization of the North Atlantic bloc, and French troops out of the NATO command. This was a step in the direction of strengthening the country's sovereignty and security and creating a certain guarantee against its being drawn into a NATO war started by the USA, and in the direction of rapprochement, in the words of de Gaulle, of all European states "from the Atlantic to the Urals." Official Paris prefers not to remember these principles today. On the contrary, France's faithfulness to its NATO obligations and its resolve to strengthen this aggressive alliance and friendship with the USA are emphasized at all levels, including at the highest.

In the opinion of the French bourgeois press, France has now become the "best student in the Atlantic classroom," to Washington's satisfaction. Take as an example the timely issue of the USA's highly dangerous attempts at transforming

Western Europe, with NATO assistance, into a launching pad for American long-range nuclear missiles, and thus into a "nuclear hostage" of militarists of the United States. Planning to place these missiles in allied West European countries, the Pentagon intends to change the evolved balance of military forces in Europe in its favor and to create a nuclear first strike potential. When in December 1979 the bosses of the bloc adopted their infamous decision to rearm NATO with nuclear missiles, in principle France assumed a neutral position. Today things are otherwise.

Paris has completely accepted NATO's false thesis that the Soviet Union "violated" the balance of forces in Europe, and it is actively supporting American plans. Together with other countries of the North Atlantic bloc, France is voting for decisions that confirm the intention of its government to place new missiles in West Europe by the end of 1983, if the Soviet Union does not agree to American conditions for Geneva talks--that is, to its one-sided disarmament. The French president signed a military political declaration adopted, to the USA's liking, at a conference of the leaders of seven capitalist countries in Williamsburg in May 1983. This document approves the program of escalating the USA's and NATO's aggressive anti-Soviet military preparations, it declares that "the security of the West is indivisible," and it gives its blessing to the deployment of "Euromissiles."

The June (1983) meeting of the NATO council adopted a similar decision in favor of deploying American nuclear missiles. For the first time after France left the bloc's military organization, its rulers obtained a possibility for celebrating another militaristic black sabbath in Paris. The meeting itself proceeded in accordance with the American scenario, in a cold war spirit, and it rubber-stamped all decisions useful to the USA. It was with special satisfaction that Washington accepted the final communique, which asserted that the security and sovereignty of West European NATO countries "is guaranteed by the presence of North American troops on European territory and by the USA's strategic nuclear obligations in relation to Europe."

It was once again emphasized from the Elysee Palace in connection with this meeting that France "is approaching its role in the Atlantic alliance with full responsibility." "It is completely obvious that formally, this meeting changes nothing," noted the bourgeois newspaper LE MONDE, "but from a political point of view, the fact that the meeting was held in Paris confirms that France is drifting more and more into the American fairway."

Paris not only supports NATO's well known "dual decision" concerning deployment of American missiles in West Europe. It is categorically against including France's nuclear missile within the total balance of the ratio of forces, which causes objective difficulties in the search for mutual acceptable solutions. This refusal is motivated by the idea that these weapons have an "independent" and a "purely national nature," that they are under the control of the French president only, and not the NATO command, and finally that they are intended "for defense" and that in terms of their total yield, they cannot be compared with Soviet nuclear potentials.

However in the estimation of foreign specialists, these arguments do not withstand criticism. France not only remains a member of the aggressive NATO bloc, but it is also developing comprehensive ties with its military organization, especially on an anti-Soviet basis. The groundlessness of Paris's position was revealed even in a special report from the U.S. Congress. It noted that what is most important is not if France is in the alliance's military organization or not, but that in the case of war, it must act in accordance with NATO treaty obligations it has accepted.

Moreover France itself claims the role of the world's third nuclear power. According to reports in the foreign press its atomic arsenal now contains 146 medium-range nuclear weapon delivery vehicles (94 land and sea launched ballistic missiles, 48 Mirage-4 bombers*). There is also a significant number of tactical nuclear weapon delivery vehicles (Pluto guided missiles, air force and navy airplanes). Plans are being implemented for increasing the nuclear potential by building new atomic missile submarines (there are plans for increasing the number of atomic missile submarines to seven units), for adopting new multiple-warhead ballistic missiles and improving tactical nuclear weapons. The total number of ballistic missiles is to be increased to 130, and the number of nuclear warheads is to be increased to 690. Completion of research on and testing of a neutron weapon and its readiness for mass production were announced in Paris. For practical purposes all of this French weaponry is now an inherent part of NATO's atomic arsenal.

The French Communist Party, which, as we know, has four representatives in the government, is expressing serious reservations in relation to many aspects of France's military-political course, including its mutual relationships with NATO. An announcement by the Politburo of the French Communist Party emphasized in connection with France's participation in the Williamsburg conference that this step limits the country's freedom of action. French communists once again confirmed that they are decisively opposed to plans for placing new nuclear missiles in West Europe. French Communist Party General Secretary Zh. Marshe [transliteration] stated in an interview by the weekly journal TEMUAN'YAZH KRET'YEN [transliteration] that inasmuch as France is a member of NATO, the Soviet demand for considering its nuclear resources in nuclear arms limitation talks is doubtlessly justified.

The pro-Atlantic tendency in French policy can also be discerned in the area of practical cooperation with NATO's military organization and with individual member countries. As is emphasized in the foreign press, these trends manifest themselves as coordination of operational and strategic plans, the conduct of joint maneuvers and exercises, interactions in air defense, reconnaissance and rear support, joint development and production of weapons and military equipment and so on. In the estimate of the supreme commander in chief of the bloc's combined armed forces in Europe, General B. Rogers (he was officially received in Paris in May 1983), "extremely close multilateral and bilateral

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* Thirty-four combat-ready airplanes, four in a training subunit and 10 in reserve.

cooperation exists" with French military chiefs, which will bear its fruits in the case of war.

France's turn in the direction of NATO is accompanied by intensification of anti-Soviet accents in its military policy. Development of the armed forces is based on the conception of "an expanded security zone." Though in concealed form, this conception names only one opponent--the Soviet Union, which must be opposed both in Europe and in other regions of the world. In this respect it is completely in tune with the new American military strategy of "direct confrontation."

Recently France approved a 5-year military program for 1984-1988 prepared by the government. For the first time in the history of the Fifth Republic the USSR is named directly as an opponent in this official document. The authors believe Soviet missiles to be the principal cause of growth in military tension in Europe. These calculations, borrowed in their entirety from the arsenal of NATO anti-Soviet propagandists, are the basis for the conclusion that France needs to strengthen its armed forces. This absolutely false motivation was met with rejoicing in reactionary circles. One of the former military chiefs of the French army declared: "When I became acquainted with the motives of the military program for 1984-1988, I said: Good for them! The Soviet threat is clearly stated in these motives. Prior to 10 May 1981 (before the French Socialist Party came into power.--*Yu. Ye.*), no one would have ventured this step."

Paris does not make it a secret that French ballistic missiles are already aimed at Soviet cities and that the combat patrol areas of French atomic submarines are being coordinated with the American command. The military press believes it a quite ordinary thing to keep a count of the targets which French nuclear weapons could reach on the territory of the USSR and other Warsaw Pact states, and the number of missiles this would require, and moreover to discuss different variants of warfare in the composition of the NATO troops against the Soviet Union.

As an example we can cite the "findings" of Army General Gi Meri [transliteration], who had recently occupied the top military post--chief of staff of the armed forces. Writing the lead article for the military-theoretical journal DEFENSE NATIONAL (January 1983), he stated in no uncertain terms: "In the modern conditions, only the Soviet bloc can be a potential opponent." In the words of the article's author, the USSR is supposedly intending to utilize, for the purposes of "establishing the world supremacy of Soviet communism," both a "direct strategy"--that is, "conquering West Europe by military means," and an "indirect strategy--for the purpose of subordinating the Western countries without using weapons. "In this sense," the French general says, "we have already entered into World War III, and we must prepare for combat side by side with our allies beyond our borders." It is also typical that the new chief of staff of the armed forces, General Zh. Lakaz [transliteration], declared that France is now actively studying the question of the participation of its armed forces "in the operations of NATO forces at the first signs of a crisis or conflict."

As is noted in the foreign press, the French troops are employing the practice, borrowed from the American army, of dressing troops designated as the enemy in Soviet uniforms. The command believes that this makes the training situation "close to that of combat," and that it psychologically prepares the personnel for war against a concrete "probable enemy." Moreover while in former times this effort was usually limited to drawing stars on the helmets of "enemy" soldiers, now things are going much further. Thus in 1983 during exercises of the 30th Mechanized Regiment in Luneville (in the country's northeast), part of the personnel were dressed in clothing similar to the Soviet military uniform. The bourgeois journal FRANS-SUAR MAGAZIN reported in an article titled "The Russians Were Unable to Take Luneville": "The orange troops, which traditionally represent the enemy in all maneuvers, were clothed in the uniform of the Soviet Army. The buttoned jackets and muff caps imparted disturbing realism to the operation." This unworthy anti-Soviet spectacle was angrily condemned by the Communist Party's newspaper HUMANITE. "There was a time when Soviet Army soldiers clothed in buttoned jackets and muff caps fought and died in Stalingrad," it recalled. "For their freedom and for the freedom of Luneville. And now they are portrayed as enemies."

Even the French soldiers complain that the former orders still remain in the army, and that the tone continues to be set by a reactionary officer corps. Thus a group of soldiers serving with the French troops in the FRG had the following to say in an interview with a correspondent from the newspaper LE MONDE. "The officers--almost all of them are from the French Foreign Legion* and the parachute troops--yell at us and brainwash us. They treat us like dogs, like some sort of pawns.... They never tire of asserting that the Russians are our traditional enemies, even though it was against the Germans that we have fought three times."

The intensification of pro-NATO and anti-Soviet tendencies in military policy is fully to the liking of French reactionary circles. However, inasmuch as appetite goes away when you eat, they are demanding even greater subordination of France's interests to the dictate of the USA and NATO. Thus the French "Association for an Atlantic Community," in which the most double-dyed reaction has entrenched itself, is not above frightening the public with the notorious "Soviet military threat" and demanding the immediate return of the French army into the military organization of North Atlantic bloc. During the June meeting of the NATO Council the Atlantists convened a noisy anti-Soviet mob in Paris. Mari-Frantz Garo [transliteration], a former advisor to President G. Pompidiou, was the organizer of this emergence of ultrareactionaries. In progressive

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* The French Foreign Legion is part of the armed forces. It was formed primarily as the striking detachment of French colonialism in Indochina (1945-1950) and in Algeria (1954-1962). It is manned by French and foreign citizens, including persons with a criminal past. In 1960 its strength was 40,000 persons, and in 1980 it was 7,500.

circles she is referred to as "Madam Pershing," because she tirelessly asserts that "the Soviet Union has taken it to mind to subjugate the world" and that "the only chance of salvation is the American 'Pershings'." Together with other Atlantists she is even arguing that France should itself agree to offer its national territory to American nuclear missiles. The idea of creating a "European army" in the assistance of NATO was once debated by this mob, which also included C. Hernu, the country's minister of defense. This idea was favorably met by the convened anti-Soviets, who included NATO General Secretary Y. Luns [transliteration].

French military policy is also characterized by a tendency toward continual growth in outlays for militaristic goals. While the boundaries of France are all quiet and even the signs of a threat from neighbors, both near and far, are nonexistent, and while the government is confronting many serious economic and social difficulties within the country, the total outlays of the defense ministry are increasing significantly. The dynamics of their growth appear as follows: 1981--124 billion francs, 1982--145 billion, 1983--158.9 billion. The next five-year plan provides 830 billion francs, of which almost a third is allocated to increasing the nuclear missile potential. As we know, on the USA's insistence, a mandatory annual 3 percent increase in military outlays has been established in NATO. France is significantly exceeding this "Atlantic norm."

NATO circles also met with satisfaction the promise of the French government to continually strengthen its 50,000-strong grouping of French troops in the FRG, allocated for operations together with the combined armed forces of the bloc; they were especially pleased with the decision to create French "rapid deployment forces" (sometimes they are referred to as the "rapid operations forces"). The latter are being formed in the American image to fulfill missions both in NATO's zone and in other regions of the world. According to explanations of the defense ministry, they will contain about 50,000 persons and include the following kinds of division: airborne, two infantry and two new divisions (an armored cavalry division formed out of the 31st Brigade, and an aeromobile antitank division).

France's heavy-handed interference in the internal affiars of Chad under U.S. pressure is the prototype of the actions of such forces. In short time, within the framework of operation "Manta," French airborne troops with a strength of up to 3,500 persons were transferred there. This grouping is still being increased. For practical purposes France has created its largest interventionist expeditionary corps since the end of the war in Algeria. French military occupation of Chad has complicated the position in this long-suffering country even more, and it creates the threat that France may be drawn into a protracted colonial military conflict. And yet, in the beginning it was declared in Paris that the troops had been sent to Chad purely as advisors. But as early as in the beginning of September reports began coming in that French Jaguar fighter bombers and Mirage tactical fighters were participating in combat on the side of Habre's puppet regime. They subjected positions of the army of the interim National Unity government in areas 640 km northeast of the capital of Chad to savage bombing raids. There are deaths and casualties among the peaceful

population. In the opinion of the newspaper HUMANITE, participation of French aviation in military operations cannot be justified in any way. The English newspaper THE DAILY TELEGRAPH turns attention to the fact that France has transformed Chad into a proving ground for testing its latest armament in combat conditions.

France's interference into the affairs of the sovereign state of Zaire together with the USA is leading to internationalization of an internal conflict, it is threatening the security of neighboring Libya, it is aggravating the situation in Central and Northeast Africa, and it is having a detrimental influence on the international climate as a whole.

In addition to the USA, France is taking an increasingly more active part in military operations in Lebanon. Two thousand French servicemen are in the so-called "multinational forces" which arrived here a year ago supposedly on a "peace mission." Led by the multipurpose aircraft carrier Foche, which has up to 40 airplanes and helicopters aboard, several French naval ships are also concentrated beside the Lebanese coast. Since September, Super Etendard and Crusader attack aircraft have been taking off from the aircraft carrier and regularly flying reconnaissance missions over Beirut and the country's mountainous regions together with American airplanes.

Many foreign reviewers associate evolution of France's military-political course with American influence. In fact, Washington has always been clearly irritated with the traditional French position in relation to NATO, and with all elements of independence in the military-political course of Paris. Acting through its agents in all of France, taking the form of right-wing forces and Atlantists of all persuasions, the present American administration is undertaking not-unsuccessful attempts at correcting this course to a direction advantageous to itself. The label "Made in USA" can be discerned in all anti-Soviet acts that have recently been undertaken in France, ones such as the growing "spy-mania" and expulsion of a group of colleagues representing Soviet institutions. "Financial gangsterism," expressed as economic plunder of the country by means of artificially inflating the value of the dollar and bank interest rates, is a powerful lever of influence upon French policy in Washington's hands.

In general, Paris has now started looking at some issues of modern times, including the method of calculating the ratio of forces and NATO's nuclear missile rearmament, through American eyes. Such a one-sided approach is rejected not only by democratic society but also by some prominent French military officials. Among the persons who signed the "Appeal of the One-Hundred," about whom a broad movement for peace is now unfolding in France, we can find the names of two of the highest officers: Vice Admiral A. Sanginetti, former deputy chief of staff of the navy, and F. Gamb'yez [transliteration], an army general who was formerly the commander in chief of French troops in Algeria. They both criticized the official military policy, and especially the unquestioning alignment with the USA and NATO. Sanginetti directly calls the thesis of "Soviet military superiority" an enormous lie, while Gamb'yez cautions against the dangerous consequences of escalating nuclear missile armament and appeals for preserving good relations with the USSR.

As far as the Soviet Union is concerned, it bases its mutual relationships with France on the fundamental interests of both countries, and it believes that development and not abandonment of comprehensive Franco-Soviet cooperation would strengthen peace and security in Europe. "Displaying restraint," said Comrade Yu. V. Andropov in an interview with the editor of DER SPIEGEL, "we are guiding ourselves by the broad interests of Franco-Soviet relations, which we treasure and which had evolved over a long period of time, and by the interests of preserving detente in Europe." These relations might enjoy further development through a new Soviet initiative proposed at the end of August 1983--a proposal for reducing to 300 units the long-range nuclear weapons possessed by the USSR and NATO (including Great Britain and France) and to eliminate Soviet missiles, which are continually decreasing in number. Implementation of this proposal would open up a real avenue of escape from the vicious circle of the arms race, of surmounting military tension in Europe and the dangerous overtones that are beclouding Franco-Soviet relations.

11004
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U.S. ARMED FORCES FIGHT DRUG ABUSE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 17-18

[Article by Col A. Ivanov, Cand Med Sci: "Drug Addicts at the 'Nuclear Trigger'"]

[Text] All-out increase in international tension and an unrestrained arms race have become the principal traits of the foreign policy pursued by the Reagan administration. The aggressive, adventuristic course of American imperialism is jeopardizing the very existence of human civilization. This danger is growing immeasurably in connection with the fact that death-dealing weapons, including mass destruction weapons, may wind up in the hands of irresponsible or sick persons, drug addicts for example. According to considerable evidence in the foreign press, people in the U.S. Armed Forces addicted to narcotics often end up in important areas of work for various reasons, and even have access to the "nuclear trigger."

As a social phenomenon, drug addiction is an inseparable trait of capitalist society, one of the persuasive confirmations of the irreversible process of its decay. Recently foreign specialists have taken note of what appears to be an explosion of drug addiction in the West, and primarily in the USA. According to data of a United Nations international council for control of narcotics, the number of American citizens abusing just the strongest drugs (heroin, cocaine, morphine) is now 4 million. Over 45 million Americans use marijuana from time to time, while about 11 million use it regularly. The scale of serious crimes is widening on this soil. President Reagan admits that in the last 10 years the number of such crimes rose by 59 percent in the USA, with more than half of all crimes being committed under the influence of narcotics. "The modern plague of America" is what drug addiction is frequently referred to as in the press.

Suffering the unbearable contradictions of the capitalist world, people resort to this resource, without considering the harmful consequences of its influence on health, in order to forget daily concerns and deprivations. Even a single use of a narcotic dramatically disturbs the mind, making the individual irresponsible, and his behavior uncontrollable. Thus we can understand the enormous danger of armed drug addicts in the army, air force or navy, and especially of those who must keep their finger poised over the "atomic button." We know, after all, that as is the case with alcoholism, drug addiction is widespread in the U.S. Armed Forces. According to official Congressional data, there was a sum total of 140,000 drug addicts and alcoholics serving in units and aboard ships in 1981.

Revealed cases of drug abuse among servicemen are often reported in the press. Thus 2 years ago not less than 60 percent of the crew of the atomic aircraft carrier "Forrestal" were "captives" of alcohol and drugs while on duty. The press carried detailed reports of cases of drug addiction aboard the atomic missile submarine "Thomas Jefferson." During the investigation one of the seamen declared that his fellow servicemen offered him marijuana the second day after joining the crew. It soon became known to him that over 20 of the 140 crewmembers were constant users of narcotic drugs. An investigation established regular use of drugs by crewmembers of the atomic missile submarines "George Washington" and "Theodore Roosevelt." Aboard the latter, 17 seamen were punished in just a single year.

Drug addiction is especially widespread among servicemen outside the continental USA. General Rogers, the supreme commander in chief of the NATO combined armed forces in Europe, admitted that up to 9 percent of the American contingent of these forces use heroin. The population of West Europe and other regions in which American troops are stationed must suffer the presence, on their own land, of strangers afflicted with serious flaws that make them socially dangerous. There are many examples of this. Thus the West German press reported a major operation against black market drug trade in the city of Hanau. American soldiers from the local garrison participated in this trade. Citizens of the FRG were also drawn into the criminal activity. The value of the narcotics seized from the black-marketeers was 3.6 million West German marks. One hundred eighty U.S. servicemen and 105 local residents were arrested. In the course of one of the operations against drug addiction, 89 American soldiers and officers storing narcotics for resale worth over 3 million marks were detained. An investigation once again revealed participation of citizens of West Germany in the crime. In early 1983 seven American servicemen were arrested in Japan for smuggling narcotics by ship from American bases in the Philippines.

Abuse of narcotics and alcohol often leads to dangerous accidents. Thus an investigation of the circumstances behind a disaster that occurred on 26 March 1981 aboard the atomic aircraft carrier "Chester W. Nimitz" revealed that at least six of the deceased pilots had been strongly influenced by narcotics while performing their official duties. According to the statistics 15-20 percent of all accidents in American naval aviation are the consequence of abuse of drugs and alcohol by flight crews. Many reports have been published of accidents and disasters occurring during the control of military equipment, and of various sorts of unmotivated acts by American soldiers and officers in which there were sufficient grounds for suggesting that narcotics and alcohol intoxication had played a role. It was noted in this connection that according to official Pentagon data, 32 serious accidents involving nuclear weapons were recorded in the USA between 1950 and 1980; in this case as of 1976, 120,000 servicemen had some degree of access to such weapons. Of these, 3,647 persons were removed from their posts for reason of chronic alcoholism, drug addiction or mental instability just in 1972 alone.

A program against drug addition and alcoholism foreseeing coordinated measures in all of the armed forces was undertaken in 1971. Each year this program is adjusted and expanded in accordance with the specific situation. It turns priority attention to measures for weeding out drug addicts when recruiting

personnel, inasmuch as abuse of these drugs is especially widespread among young people coming to the recruitment centers. Thus according to official statistics, as a cause of mortality of men from 18 to 24 years old, drug overdoses are fourth. They are exceeded only by motor vehicle accidents, homicides and suicides.

Steps are also being taken to deprive soldiers of the possibility for acquiring narcotics. In the navy for example, 50 special teams of dogs that can sniff out drugs aboard ships have been created. Servicemen are subjected to periodic and surprise medical examinations in the units with the purpose of revealing drug addicts. As a rule, the drug addicts that are revealed are dismissed from the armed forces.

According to reports in the foreign press, as a result of the application of severe measures the level of drug abuse among soldiers and officers was decreased somewhat in recent times. However, this dangerous fault remains an important problem both in the armed forces and in American society as a whole. Drug addicts with bombs are a reality in the USA, one eliciting serious alarm in the world public. On the whole, however, despite the widespread occurrence of drug addiction and alcoholism in the American troops, they remain a tool of the ruling circles of the United States sufficiently dangerous to peace and prepared to participate in the dirtiest, most aggressive measures of imperialist reaction.

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ARCTIC COMBAT REQUIRES SPECIAL CONSIDERATIONS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 25-29

[Article by Col K. Samigulin, Cand Mil Sci, lecturer: "Combat Operations in Arctic Conditions"]

[Text] Pursuing a course of further reinforcement of its militaristic policy and of increasing the arsenal of nuclear and conventional armament, the military-political leadership of the USA has initiated an extensive program for development and comprehensive preparation of all armed forces for combat activities in different theaters of military operations, and in diverse climatic conditions, including in arctic regions which, as we know, occupy rather vast territories of North America , Europe and Asia. The American regulations emphasize that inasmuch as they have important significance to the United States from the standpoint of its national interests, the armed forces must be prepared to conduct combat operations in such regions.

General Characteristics

Foreign specialists classify arctic regions in terms of physicogeographic and climatic conditions as especially difficult for combat operations. They are characterized by very low temperatures (down to -50°C and lower in winter), a deep snow cover, permafrost, snow storms and blizzards lasting many days, the long polar night in winter months, impassable tundra marshes, and a large quantity of lakes, rivers and bogs that appear in summer. Specific phenomena such as absence of a clearly discernible horizon are also observed here, hindering air navigation and movement of ground transportation, as well orientation of personnel on the ground.

The environmental conditions have a serious influence on troop activities, on the use of artillery, tanks, and aviation and on logistical support. The period from mid-winter to early spring (the start of the spring thaw), when the tundra becomes practically impassable, is believed to be the most favorable time. The duration of intense frosts is an unfavorable factor. During them, the use of weapons and combat equipment becomes complicated because the action of mechanisms slows down, cases of jamming and breaking of parts and units grow in frequency, it becomes harder to start up engines and keep them operating normally and so on. When fired at low temperatures, various fire weapons produce a revealing trail that follows the projectile's trajectory to

its target, which requires frequent change of fire positions. The open, monotonous terrain hinders concealment and camouflage of the personnel and combat equipment, which increases the possibility of their detection by enemy air reconnaissance.

Low temperatures hinder the actions of troops because a constant need arises for sheltering and warming them, and because they become more dependent on rear support. Moreover it becomes more difficult to engineer the positions and areas of troop operations, and to lay roads. All of this, the foreign press notes, increases the time it takes to fulfill combat missions in comparison with ordinary conditions. This is why consideration of this factor and allocation of more time are recommended when preparing for and planning combat operations.

Serious attention is being devoted to equipping the troops with special armament and gear. Systems for starting cold engines are being installed in armored and motor vehicle equipment, and systems for warming personnel and heating food are being set up. Formations and units are being supplied with vehicles having good cross country capabilities. The personnel are being given clothing and gear intended for use in a cold climate.

Personnel undergoing combat training for action in arctic regions are given additional training in protection from cold in winter, in protection from mosquitoes, biting flies and midges in summer and in the rules of caring for weapons and combat equipment and the methods of their combat use in intense frosts.

Special attention is being turned to raising physical endurance, to special technical training, to the ability to maintain orientation and to maintain a state of readiness for action at night. Systematically replacing personnel of the units and subunits to permit their rest in specially equipped shelters is recommended as a means for maintaining the combat capabilities of the troops at a high level in severe conditions.

Offense

As is noted in American regulations, offensives are organized and conducted in arctic regions on the basis of general principles also typical of other climatic conditions. At the same time, there are a number of specific features in both the organization of combat activities and the use of different branches of troops, weapons, and combat equipment. One of them is the choice of the method of offense and the sector of the main thrust.

It is believed that an offensive would usually begin from a position of direct contact with the enemy. It may be conducted on the move in the event that the road network and the terrain permit the use of all branches of troops. The most convenient time of the year for offensive operations is believed to be March-April and August-September, when day alternates with night on a regular basis and the weather conditions favor combat use of combat equipment.

Selecting the sector of the main thrust in such a way that troops in the main grouping would have the possibility for maneuvering during the offensive with the purpose of outflanking or enveloping enemy defensive positions is recommended. In this case their actions may be supported by tactical airborne forces, together with which they will fulfill their assigned missions.

The terrain and the weather conditions complicate the actions of the troops because they reduce the rate of advance, making it necessary to assign combat missions to units and subunits at a lesser depth than in ordinary conditions. It is believed that troop groupings operating in certain sectors will often be deprived of the possibility of obtaining additional forces and resources. Therefore the troops will often have to execute their missions with the forces they possessed at the beginning of the offensive.

Considering the complex conditions of the terrain and weather as well as the nature of enemy defenses is recommended when organizing the combat formations. In view of this, the manuals emphasize the need for deeply disposing the combat formations (in two or three echelons) and creating strong reserves. If the situation and the terrain allow, replacing troops in the first echelons with subsequent echelons or reserves more frequently is believed to be suitable.

It is noted that in a cold snowy winter, when use of combat equipment is difficult, and impossible in some areas, infantry units and subunits may conduct offensive operations more successfully than formations of other branches of troops. Use of snowshoes, skis, snow vehicles and cross-country transporters is recommended for movement of personnel on the battlefield.

According to the viewpoints of the American command, because of significant gaps and exposed flanks in enemy defenses, deep raids must be made into the enemy rear with the purpose of annihilating airfields and landing pads, radar and radio navigation stations, supply bases, and rear services and other facilities. Making such raids during the time of the polar night or in adverse weather is recommended. They are usually made by specially trained sabotage detachments of platoon to battalion strength. Depending on the conditions, such detachments may move on skis, snow vehicles, cross-country vehicles, helicopters, propeller-driven sleighs and air cushion vehicles. Sometimes reindeer and dog sleds may be used to move such detachments into the enemy rear.

In tankable terrain, infantry may advance jointly with tanks. The principles of using artillery are basically the same as in ordinary conditions; however, the ammunition consumption norms for suppressing and annihilating targets are higher. When units and subunits operate in isolated independent sectors, reinforcing them with a greater quantity of artillery resources is recommended. If weather permits, it is believed suitable to actively land tactical airborne forces and aeromobile subunits in the enemy rear. Disturbance of the work of the enemy rear is believed to be one of the important missions of offense, since under these specific conditions the combat capabilities of the defending troops depend in many ways on regular operation of the rear supply system.

Defense

According to the viewpoints of the American command, defense in arctic regions is organized in correspondence with the general principles of defensive combat, though with a consideration for the unique features typical of these regions. It is believed that as a rule, a transition to defense would be made not in response to superior enemy forces but owing to unfavorable climatic conditions (lengthy and intense blizzards, snow storms, a sharp drop in temperature, presence of deep snow cover, thawing and so on).

Troops may deliberately go over to defense under such complex conditions with the purpose of compelling the enemy to attack in a situation unfavorable to him, one which would reduce his possibilities for maneuver of fire, increase the losses of his personnel and combat equipment and physically exhaust the troops, thus significantly reducing the rate of advance.

The nature of the terrain in arctic regions is such that defenses can be organized with less forces than required by ordinary conditions. Organizing defenses with regard to the unique features of the terrain in directions permitting troop operations and leading to operationally and tactically important objectives (road junctions, large population centers, airfields, naval bases, depots etc,) is recommended. As a rule, defenses are spotty in nature and they foresee creation of subunit defense areas and strongpoints.

It is noted in the American military press that static defense will be used most often in regions with a cold climate. In this case the formations and units will occupy defense zones that are wider than usual, and that they will defend independently for the most part, using the forces and resources present within their combat formations. Sometimes they will also operate with exposed flanks. It is believed that under these conditions a battalion could defend a front up to 10 km wide, a brigade could defend 20 km, and a division could defend 50 km and more. However, depending on the concrete situation these standards may be both increased and decreased.

Deeply disposed defenses are usually created in the probable sectors of the enemy's main thrust. In secondary sectors or on difficult terrain, organizing defenses with a small quantity of forces and resources is recommended. In areas where an attack by the enemy is improbable in view of unfavorable terrain, observation (ground and air) and patrols are organized.

Turning serious attention to covering exposed flanks is recommended. Intensified observation from the ground and the air is organized, patrols are sent out and minefields are laid for these purposes. Mobile groups are created out of reserve subunits to fight enveloping enemy detachments.

The regulations note that under these conditions, the troop combat formation is organized into a single echelon as a rule, and that a two-echelon organization may also be permissible in sectors in which enemy troops are concentrated or at the approaches to important objectives. In this case the bulk of the forces and resources (two-thirds and more) are placed in the first echelon, since it is believed that were the enemy to suffer defeat at the approaches to the defenses and in the course of fighting for retention of the main defense area, he might abandon his offensive.

The reserves (second echelons) of the formations and units are dispersed in areas from which they could maneuver or move up to a deployment line for a counterattack. They may be kept constantly ready for various tactical missions arising in the course of the enemy's offensive (occupation of prepared reserve positions, counterattacks, annihilation of tactical airborne forces and aeromobile subunits, providing cover to flanks and others). Motorized infantry units and subunits equipped with high-passability combat equipment and special gear are usually placed in the reserves.

Engineer organization of defense is basically the same in arctic conditions as it is in ordinary conditions. However, it is noted in the foreign press that there are a number of unique features requiring implementation of supplementary measures. They include the following: laying controlled nuclear minefields in the most important directions leading to vitally important objectives in the defense system; erecting obstacles utilizing terrain features and advantageous lines, as well as creating ice barriers on the shores of lakes and rivers, and on down- and upgrades; clearing snowdrifts from fire positions and strongpoints; building snow and ice shelters.

Platoon and company strongpoints covering the possible directions of advance of enemy troops are set up in the defense system of the units and subunits. They are located on the terrain in such a way that they would occupy a dominant position in relation to the attacker. Organizing the forward edge of defense on hills is recommended in this case, so that the attacking enemy would have to ascend their icy slopes. Concurrently this disposition of the defending troops makes it easier for them to counterattack, since they would pick up greater speed as they descend the slopes.

When creating defensive structures, it would be suitable to make wide use of fill structures (when rocky ground and marshy terrain is present), standard prefabricated structures made from metal, reinforced concrete and plastic, and locally available resources. Special attention is turned to erecting shelters, heated bunkers and dug-outs to allow the personnel to warm up and rest. It is believed suitable to make maximum use of terrain features to create obstacles at approaches to defenses, before the forward edge of defense and deep within the defenses. Forming snow banks, pouring water down hillsides and preparing hydraulic engineering structures and ice on rivers, lakes and reservoirs for demolition are recommended in this case.

According to the regulations, the fire plan for defense is to be organized in such a way as to insure fulfillment of the following basic missions: annihilating nuclear weapons as they are revealed; hitting enemy troops in concentration areas and when they move up and deploy for an attack; providing fire support to covering and security forces (when a security zone is present); repelling enemy attacks against strongpoints and defense areas; covering gaps and exposed flanks by fire; supporting counterattacking troops; hitting the enemy as he travels on roads, defiles, passes, river channels, bridges, isthmuses and so on. The launch and fire positions of rockets and artillery must be selected near roads or cross-country tracks, and they must be much farther from the forward edge than in ordinary conditions.

When organizing reconnaissance, special attention is turned to creating the system for observing all resources, and for preparing and sending reconnaissance and reconnaissance-sabotage groups and detachments on skis into the enemy rear. They may be given the following missions: disorganizing the enemy's measures to prepare for an offensive; knocking out or annihilating nuclear weapons at their positions and in concentration areas; destroying ammunition dumps and supplies; destroying road sections, bridges and communication lines; disturbing the work of the rear; spreading false rumors, and others.

Firmly holding defense areas providing cover to principal road junctions and probable directions of attack is recommended in the course of defensive combat. It is believed that maneuver in the course of defensive combat in arctic conditions is accompanied by significant difficulties, and that it requires much more time. This is why it would be best to make counterattacks along roads and in directions convenient for the advance of reserves to the flank and rear of the penetrating enemy. In view of the dispersed disposition of reserves, they can often attack from different directions.

Retrograde Operations

Retrograde operations are organized, the Western press notes, in accordance with the same principles followed under ordinary conditions. Disengagement is recommended when visibility is limited, making observation by the enemy difficult. If the need for a daytime withdrawal arises, smoke screens are used. Cross-country tracks are laid rearward from the defensive positions in order to hasten disengagement and withdrawal; following disengagement, such tracks could be mined. During disengagement, the troops must destroy all shelters and other abandoned installations that might be utilized by the enemy.

Such in general terms are the viewpoints of the command of the U.S. ground troops on organizing combat operations in severe arctic conditions. As is reported in the foreign military press, the USA and some other members of the aggressive NATO bloc are now implementing a complex of measures to prepare the troops for combat operations in arctic conditions. The most important of them are development and adoption of special equipment, armament, and gear, creation of systems for warming the personnel and heating food, and training and preparation of personnel for operations in these conditions.

Each year, troops intended for operations in these regions undergo exercises during which they practice all forms of combat operations and test different weapon systems and combat equipment, especially high-passability vehicles. In particular, an exercise code-named Brim Frost was conducted at the beginning of 1983 in Alaska. About 16,000 persons took part in it. Problems associated with offensive and defensive operations were worked out, and weapons, combat equipment and gear were tested in winter conditions. Such maneuvers have also been conducted in the northern regions of Norway.

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U.S. ARMY AVIATION PLAYS INCREASING BATTLEFIELD ROLE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 29-35

[Article by Col V. Filipov: "U.S. Army Aviation"]

[Text] U.S. Army aviation is a special branch of aviation including helicopters and light airplanes intended for combat and rear support of the ground troops.

The American command believes army aviation to be an independent branch of troops, and it views it as a means for raising the possibilities of formations, units, subunits and rear services. It was born in June 1942, when light airplanes were introduced for the first time into the TOE of certain artillery units for the purposes of observation, reconnaissance, fire correction, control and communication.

During the war in Korea (1950-1953), the ground troops began using helicopters in addition to airplanes, primarily to evacuate casualties from the battlefield. In subsequent years new types of helicopters and airplanes appeared, ones capable of the most diverse and complex missions. In the estimation of Western specialists, the war in Vietnam (1964-1973) confirmed the great potentials of helicopters in combat operations within a primitive theater of military operations, in which helicopters were the most effective and sometimes the sole means of combat and rear support. In this war, the Americans made the first use of helicopters to airlift and land troops, to provide fire support to them from the air and to fight armored targets on the battlefield.

The foreign military press reports that the Arab-Israeli war of October 1973 was a new confirmation of the greater capabilities of army aviation. Despite aggressive combat operations on both sides, helicopters successfully completed their missions.

In later years the American command continued to raise the effectiveness with which army aviation was used on the battlefield, taking account of its previous combat experience. The effort was directed at increasing the loading capacity of helicopters, their speed and range, the protection afforded to them against small-arms fire, and outfitting helicopters with various technical resources and weapon systems. This made it possible to pose new complex missions before army aviation, such as suppressing antiaircraft resources and primarily surface-to-air missile complexes, annihilating enemy helicopters in the air, conducting electronic surveillance and electronic countermeasures, and others.

Today, judging from data in the foreign press, there are more than 8,000 helicopters in the U. S. ground troops. They are divided in terms of their purpose into four basic classes: attack (AH-1G HueyCobra and AH-1S Cobra-TOW), observation (OH-6 Cayuse and OH-58 Kiowa), utility or multipurpose (UH-1 Iroquois and UH-60 Black Hawk), and transport (CH-47 Chinook and CH-54 Skycrane). In addition there are about 500 light airplanes--O-1 Bird Dog, OV-1 Mohawk, OV-10 Bronco, U-1 Otter, U-6 Beaver, U-8 Seminole, U-21 Ute.

General leadership is provided to army aviation by the army chief of staff by way of his deputy for operations and planning. Direct leadership is provided by formation and unit commanders in close coordination with the commanders of TOE or attached army aviation units and subunits.

Responsibility for developing the principles of combat use of army aviation, tactical operations, the TOE structure of its subunits and units and personnel training is borne by the command responsible for training and for scientific research associated with developing the ground troops, while the command dealing in scientific research, experimental design and logistical support to the ground troops is responsible for creating new aviation equipment and weapons and modernizing existing models, for technical support, for testing and for troop supply. The army aviation school in Fort Raker, Alabama is the principal military training institution where the training and retraining of flight and technical personnel for army aviation is organized. Instruction is offered here throughout the year in various courses, to include: basic pilot training--215 hours (175 flying hours and 40 hours of work with trainers), advanced flight crew training--12 weeks (66 flying hours), refresher (after a break in flying)--4 weeks, combat use of different types of helicopters, aviation medicine, technical personnel training, reservist training and retraining. Each year from 7,000 to 9,000 persons undergo training in the school.

Moreover problems associated with combat use and coordination with army aviation are studied in schools such as infantry (Fort Benning, Georgia), armored (Fort Knox, Kentucky), field artillery (Fort Sill, Oklahoma), air defense (Fort Bliss, Texas) and some others.

All army aviation is combined into brigades, broups, battalions, companies and platoons contained within the table of equipment of the formations, units and subunits, or it is found in the reserves of the U.S. ground troop command, in specific zones (theaters of military operations).

Divisions, separate brigades and armored regiments contain helicopters only, the numbers of which are given in Table 1 in relation to different types.

The principal army aviation subunit of infantry, mechanized, armored and airborne divisions is the battalion, while that of the airborne attack division is the army air group.

The army air battalion of an infantry (airborne) division consists of a staff and six companies: headquarters, antitank helicopter, general purpose (two), general support and repair. A battalion has a total of 130 helicopters,

Table 1. Number of Helicopters in Divisions and Separate Units of the U.S. Ground Troops

Classes of Helicopters	Infantry (Airborne) Division	Mechanized (Armored) Division	Airborne Attack Division	Separate Infantry (Airborne) Brigade	Separate Mechanized (Armored) Brigade	Separate Armored Regiment
Attack AH-1G HueyCobra and AH-1S Cobra-TOW	48[1]	42[2]	90[3]	-	-	21[2]
Observation OH-58 Kiowa	74	56	82	8	6	29
Utility and multipurpose UH-1 Iroquois	93	45	179	3	2	16
Transport CH-47 Chinook	-	-	48	-	-	-
Electronic reconnaissance and jamming EH-1H	3	3	3	-	-	2
Total	218	146	402	11	8	68

[1] Twenty-one of them are armed with TOW antitank guided rockets.
[2] All are armed with TOW antitank guided rockets.
[3] Sixty-three are armed with TOW antitank guided rockets.

including 21 AH-1S Cobra-TOW attack helicopters armed with TOW antitank guided rockets, 44 OH-58 Kiowa observation helicopters and 65 UH-1 Iroquois utility (multipurpose) helicopters.

The army air battalion of a mechanized (armored) division includes a headquarters and six companies: headquarters, antitank helicopter (two), general-purpose, general support and repair (Figure 1 and Table 2).

The army air group of an airborne attack division contains a staff, two companies (headquarters and general support) and three battalions (one transport helicopter and two assault transport helicopters). It contains a total of 202 helicopters. In addition an antitank helicopter battalion (four companies: headquarters and three antitank helicopter, 112 helicopters, 63 of which are armed with TOW antitank guided rockets) and aeromobile observation (five companies: headquarters, three observation aeromobile and one observation, 85 helicopters) are operationally subordinated to the commander of the army air group.

Table 2. Personnel Strength and Number of Helicopters in an Army Air Battalion of a Mechanized (Armored) Division

Personnel and Armament	Command, Staff and Headquarters Company	Two Antitank Helicopter Companies, in Each	General Purpose Company	General Support Company	Repair Company	Total in Army Air BAttalion
Personnel	101	240	155	188	201	1125
Helicopters:						
Attack AH-1S Cobra-TOW	-	21*	-	-	-	42
Observation OH-58 Kiowa	-	12	-	32	-	56
Utility (multipurpose) UH-1 Iroquios	-	3	23	14	2	45

* Armed with TOW antitank guided rockets.

The army air group contains a total of 399 helicopters: ninety AH-1G HueyCobra and AH-1S Cobra-TOW attack helicopters (Figure 2 [not reproduced]) (63 of them are armed with TOW antitank guided rockets), 82 OH-58 Kiowa observation helicopters, 175 utility (multipurpose) UH-1 Iroquois helicopters and 48 CH-47 Chinook transport helicopters.

Army air groups of the following composition have been formed to provide combat and rear support to the V and VII Army Corps of the U.S. ground troops in Europe: staff, headquarters company, corps army air headquarters company, separate reconnaissance company, general support army air battalion and antitank helicopter battalion. It contains a total of 244 helicopters and 23 airplanes, to include 63 AH-1S Cobra-TOW attack helicopters armed with TOW antitank guided rockets, 43 OH-58 Kiowa observation helicopters, 97 UH-1 Iroquois utility helicopters, 32 CH-47 Chinook transport helicopters, nine CH-54 Skycranes, 18 OV-1 Mohawks and five U-21 Utes.

The ground troops also possess a separate antitank helicopter brigade, which includes a staff, a headquarters company, a signal company, two antitank helicopter battalions, an aeromobile reconnaissance battalion and a rear support battalion. It is armed with 336 helicopters, including 153 AH-1G HueyCobra and AH-1S Cobra-TOW attack helicopters (135 armed with TOW antitank guided rockets), 106 OH-58 Kiowa observation helicopters, 61 UH-1 Iroquois utility (multipurpose) helicopters and 16 CH-47 Chinook transport helicopters (Figure 3 [not reproduced]).

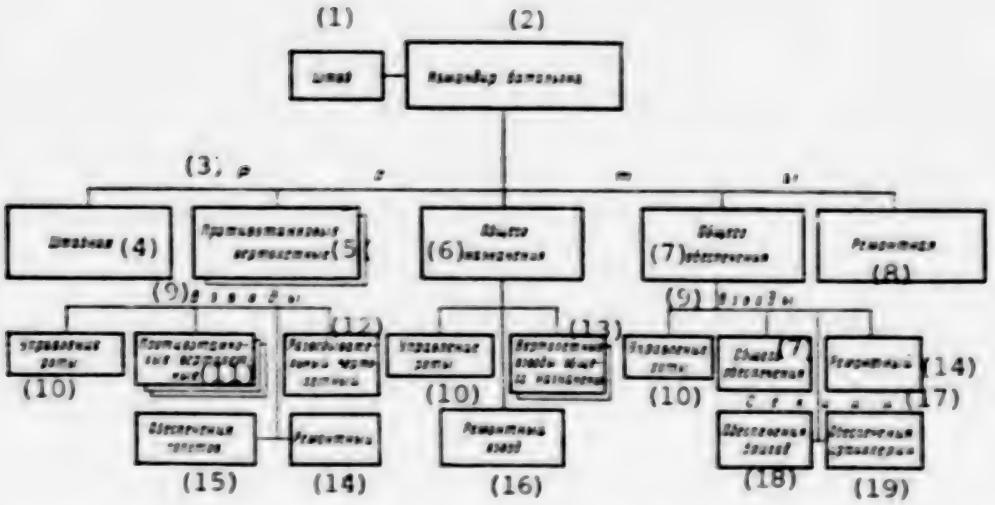

Figure 1. Organization of the Army Air Battalion of a U.S. Mechanized (Armored) Division

Key:

1. Staff
2. Battalion commander
3. Companies
4. Headquarters
5. Antitank helicopter
6. General-purpose
7. General support
8. Repair
9. Platoons
10. Company administrative
11. Antitank helicopter
12. Observation helicopter
13. General-purpose helicopter platoons
14. Repair
15. Flight support
16. Repair platoon
17. Sections
18. Brigade support
19. Artillery support

The American command believes that army aviation increased the combat capabilities of ground troops significantly in recent years. By using helicopters, formations and units are able to move 25 times faster on the battlefield than on foot, and eight times faster than with ground transportation resources. Besides performing transport missions, army aviation is an effective combat resource capable of supporting troop activities on the battlefield. It is on this basis that modernization of helicopters and development of new helicopters are continuing in the U.S. ground troops. In particular, all presently existing AH-1S Cobra-TOW attack helicopters that were adopted prior to 1979 and all OH-58 Kiowa observation helicopters and CH-47 Chinook transport helicopters are being modernized, development of the new AH-64A Apache attack helicopter is coming to its conclusion, and observation and heavy transport helicopters of the future are being designed.

The UH-1 Iroquois was the basis for creating the EH-1H helicopter, which is within the composition of the AN/AR[illegible]-33 Quick Fix-1 helicopter radio communication jamming complex intended for electronic suppression of ground radio stations in the 1.5-6 MHz range. Moreover the UH-60A Black Hawk helicopter is being used as the basis for developing the EH-60A, which will be in the

composition of a helicopter electronic surveillance and electronic suppression complex. Work is simultaneously proceeding on the EH-60B helicopter, which will be in the composition of the SOTAS helicopter observation and artillery spotting system.

The U-21 Ute airplane was the basis for the design of the RU-21E and RU-21H airplanes outfitted with the Seferm [transliteration] Leader and and Guardrail-V systems and intended for electronic surveillance and electronic countermeasures, for determination of the locations of radio stations, for direction finding and for interception and collection of messages.

In the opinion of American military specialists, provision of antitank guided rockets to helicopters has made it possible to destroy practically all enemy targets with high accuracy and from considerable range. In their estimation, the AH-64A Apache attack helicopter can carry 16 Hellfire antitank guided rockets and hit up to six tanks in a single sortie, while the ratio of the number of tanks put out of action to the number of helicopters brought down averages 12:1.

In 1981 the U.S. Department of the Army decided to conduct a reorganization of the ground troops, in the course of which--during the 1980s--all formations and units will undergo reequipment and change in their TOE structure. Thus battalions in the divisions are to be replaced by army air brigades outfitted with new, more sophisticated helicopters. According to tentative data a brigade of this sort in a mechanized (armored) division will consist of a staff, a headquarters company and four battalions: two antitank helicopter, one close support helicopter and one observation. There are to be a total of 146 helicopters: fifty AH-64A Apache attack helicopters armed with Hellfire antitank guided rockets (Figure 4 [not reproduced]), 54 OH-58 Kiowa observation helicopters, 30 UH-60A Black Hawk utility (multipurpose) helicopters (Figure 5 [not reproduced]), and 30 EH-60 electronic surveillance and jamming helicopters. Similar changes are also to be made in the organizational structure of army air units and subunits of other divisions, separate armored regiments, army corps and the U.S. ground troop commands in specific zones (theaters of military operations).

The command of the ground troops views further development of army aviation as one of the most important directions in development of the ground troops in the 1980s. The forms and methods of combat involving the use of army aviation are being analyzed and worked out in application to different theaters of military operations on exercise fields and proving grounds, and in the course of exercises and maneuvers. The combat training of ground troops is being organized and conducted with the active participation of helicopters. Especially great significance is being attached to developing the ways of fighting tanks in coordination with tactical aviation, primarily A-10 attack airplanes.

The American command feels than when AH-1S Cobra-TOW attack helicopters operate jointly with A-10 airplanes against tarks and infantry fighting vehicles, their combat effectiveness rises significantly. The combat training experience confirms that the effectiveness of a joint attack is four or more

times greater than the impact of their separate use in the same numbers. Tactical and army aviation participates regularly in joint exercises to work out and improve the tactics of coordination.

Foreign military specialists believe that joint actions by helicopters and attack aircraft require detailed planning, fast reaction of commanders to any changes in the situation, and the personnel's excellent knowledge of the terrain. Special emphasis is laid on the need for surprise, which is achieved through competent use of the concealing properties of the terrain with the purpose of surmounting enemy air defense zones. Airplanes and helicopters travel to the start line at minimum altitude (not over 30 meters); in this case, in all circumstances and to the extent that the actual conditions permit, the helicopters should fly below the attack airplanes, maneuvering even in gaps between stands of trees or other terrain features. Working out coordination within the same range of altitudes is one of the principal requirements of tactical training for antitank attack aviation.

In the opinion of American experts the main danger to American aviation is represented by conventional antiaircraft artillery and helicopters carrying weapons effective against low-flying airborne targets. This is why much attention is devoted in the course of combat training to organizing coordination of army aviation with artillery. Field artillery and mortars play an important role in support of the actions of attack groups, especially in suppressing the enemy's antiaircraft resources, and primarily those that are within the combat formations (columns of route) of tank units. This mission is to be executed through the joint efforts of field artillery, attack helicopters and A-10 attack airplanes. The exercise experience demonstrates that in a number of cases when attack aircraft begin their attack, the intensity of fire from friendly artillery decreases, which results in an increase in enemy fire and unjustified losses. Thus the recommendation is to plan for transfer of artillery fire deeper in or on the flanks of the sector against which antitank attack aircraft make their strikes, interacting as a rule with brigades or battalions but capable of operating independently as well. In offense they are used against the counterattacking enemy, while in defense they reinforce the antitank stability of the defenses.

It is felt that as a TOE resource of ground troop formations and units, attack helicopters engage tanks before A-10 attack airplanes are called in for close support. Therefore they may be given the mission of suppressing the enemy's antiaircraft resources by means of a massed rocket strike, and thus set the stage for actions by attack airplanes.

Basing itself on the combat training experience, the American command feels that the main prerequisites for dependable coordination between attack helicopters and attack airplanes in the fight against tanks are a detailed knowledge of the terrain on the part of the crews, good organization in the performance of joint missions and personal contact with formation and unit commanders in the sectors of planned operations.

It is noted in foreign publications that owing to its properties, its equipment and armament, army aviation is enjoying increasingly wider application in

complex and diverse missions in behalf of the ground troops, in different combat situations and in all theaters of military operations. It is believed, as an example, that it will be used in an organized theater primarily to fight tanks and other armored targets, to provide fire support to the troops, for electronic surveillance and for jamming purposes. In poorly organized and primitive theaters its main role will entail raising the firepower and supporting tactical maneuver of combined-arms formations and units, and fulfilling special missions.

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DESIGN, CAPABILITIES OF ISRAELI ARMOR DESCRIBED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 35-39

[Article by Engr-Col V. Safonov, Cand Tech Sci: "Israeli Armored Equipment"]

[Text] Enjoying the complete support of the United States, the ruling circles of Israel are pursuing an openly expansionistic foreign policy, one which has been a source of constant tension in the Near East for many years. The Israeli armed forces are the implement of this policy. Tank formations and units (11 tank divisions and 33 tank brigades) are the foundation of the ground troops.

As of the beginning of 1983, there were about 3,600 tanks in the Israeli tank fleet. to include 1,100 English Centurion tanks, 650 American M48 tanks, over 1,000 M60 tanks of various modification, a certain quantity of M4 Sherman tanks (obsolete) and 200 Merkava [transliteration] tanks produced by Israel. There are over 4,000 armored personnel carriers of various kinds in the ground troops, most of which are represented by the American M113 tracked APC. The tactical and technical characteristics of the different models of armored equipment supplied to the Israeli ground troops are given in the Table below.

Considering the variety of tank types in the fleet and the fact that most tanks are obsolete, measures to modernize these tanks have been implemented in Israel. The objective of this was not only to raise the level of the fighting and technical properties of the old models to modern requirements but also to insure a high degree of unification of tanks of different designs (primarily in relation to ammunition, fuel, oil and other expendables).

Thus English MK5 Centurion tanks were modernized (Figure 1[figures not reproduced]). The 83.4-mm gun was replaced by the M68 105-mm rifled gun, and the gasoline engine was replaced by a diesel engine. A hydromechanical transmission is installed in a single block with the engine. As with the gun, both machine units are from the American M60A1 tank.

A great deal of work was also done to modernize obsolete American M48 tanks. Here again, the changes basically boiled down to replacing the 90-mm gun by a 105-mm gun, and the gasoline engine by a diesel engine. Moreover a new commander's cupola of Israeli design was mounted on the tank, and additional armor was applied. According to a report in the journal ARMOR, so-called

Tactical and Technical Characteristics of the Models of Armored Equipment Possessed by Israeli Ground Troops

(1) Наименование (год принятия на вооружение)	(2) Боевой вес, т / (3) экипаж (десант), человек	(4) Габариты, м: (5) высота / (6) длина * × ширина	(7) Калибр оружия, мм: (8) пушки / пулеметов (9)	(10) Мощность двигателя, л. с.	(11) Максимальная скорость движения км/ч / (12) запас хода, км
(14) Израильский танк «Меркава» Мк1 (1979)	58 / 4	2.64 / 7.5×3.7	105 / (22) два-три 7.62	900	44 / 400
(15) Американский танк М60А1 (1973)	48 / 4	3.26 / 6.9×3.6	105 / 7.62 и 12.7 (23)	750	48 / 500
(16) Американский танк М48 (усовершенствованный, 1970)	49 / 4	3.12 / 6.95×3.6	105 / (24) два 7.62	750	48 / 460
(17) Английский танк «Центурион» Мк5 (усовершенствованный, 1970)	52.8 / 4	2.96 / 7.8×3.3	105 / два 7.62	750	43 / 380
(18) Американский танк М4 «Шерман» (усовершенствованный, 1966)	39.6 / 4	2.9 / 5.93×2.98	105 / 7.62 и 12.7	460	45 / 240
(19) Американский гусеничный бронетранспортер М113А1 (1965)	11 / 1 (12)	2.2 / 4.8×2.7	— / четыре 7.62 и 12.7	215	68 / 480
(20) Израильская колесная БРМ RBY Мк1 (1971)	3.6 / 2 (6)	1.7 / 5×2	(25) — / четыре 7.62 и 12.7	120	100 / 550
(21) Израильская колесная бронированная машина «Шоэт» (1981)	9.7 / 2 (10)	2.1 / 6.64×2.2	— / четыре 7.62 и 12.7	172	90 / 400

* Length of the hull without the gun.

Key:

1. Name (year of adoption)
2. Combat weight, tons
3. Crew (assault force), persons
4. Overall dimensions, meters:
5. Height
6. Length* × width
7. Weapon caliber, mm:
8. Gun
9. Machineguns
10. Engine horsepower
11. Maximum engine speed, km/hr
12. Range, km
14. Israeli Mk1 Merkava tank (1979)
15. American M60A1 tank (1973)
16. American M48 tank (improved, 1970)
17. English Centurion MK5 tank (improved, 1970)
18. American M4 Sherman tank (improved 1966)
19. American M113A1 tracked armored personnel carrier (1965)
20. Israeli RBY Mk1 wheeled reconnaissance armored vehicle (1971)
21. Israeli Shoet [transliteration] wheeled armored vehicle (1981)
22. Two or three
23. And
24. Two
25. Four

"active" armor* that reduces the effectiveness of hollow-charge ammunition was used on some Centurion, M48 and M60 tanks (Figure 2) during Israeli aggression in Lebanon.

American World War II vintage M4 Sherman tanks possessed by the Israeli army have been partially modified into self-propelled 155-mm howitzers and 160-mm mortars, but the bulk of them have been reequipped with 105-mm tank guns and diesel engines. Although French 105-mm rifled guns were mounted on them, their ammunition was unified with that used by other tanks armed with an English gun of the same caliber.

In the opinion of foreign specialists the Israeli military leadership feels that no modernization can insure an improvement in the combat characteristics of old tanks which would fully satisfy the requirements of modern warfare. This was one of the basic reasons why Israel designed and organized production of its own tank. Two other reasons include: First, the tanks that Israel could have acquired abroad (including the new American M1 Abrams) do not completely satisfy the unique conditions of the Near East theater of military operations, and second, in the opinion of Israeli specialists a local production operation would permit timely development and introduction of new technical concepts into existing tanks.

Production of the first Merkava tanks (see colored insert [not reproduced]) began in late 1979. This necessitated major reconstruction of the existing military repair plant, as well as of a large number of state and private enterprises, for example the "Urdan" [transliteration] steel casting plant. As is reported in the foreign press, the United States contributed about $100 million as assistance in developing and organizing production of this tank. Today about 30,000 parts and units for the Merkava tank are manufactured by more than 230 enterprises in Israel, and up to 12 percent of its components are imported from abroad. A dead-end method rather than conveyers are used to assemble the tanks at a rate of four or five per month. Conversion to conveyer assembly is planned for the future.

Among the basic combat characteristics of the Merkava tank, Israeli specialists place priority on protection, followed by firepower and mobility. Realization of this conception required the use of new layout and other design concepts.

The most important feature of the Merkava tank is its layout: The engine-transmission compartment is in the front right part of the hull, and its long axis coincides with the control compartment, which is located forward and left. The entire aft part of the hull is an ammunition compartment. It houses 12 containers (each filled with four quick-firing fixed rounds), and another two containers (with two rounds each) are secured to the hull by a metallic strap. Considering that eight rounds are in the turret, the basic ammunition load is 60 rounds.**

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* For greater detail on "active" armor, see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 8, 1983, p 38.--*Editor.*

** According to other information in the foreign press, the total ammunition load of the Merkava tank is 92 rounds (eight ready for firing and the rest in containers).--*Editor.*

There are three hatches in the hull's rear plate: a left hatch for access to the storage batteries, a right hatch providing access to a filtered ventilation system, and a middle (two-door) hatch for loading ammunition. The ammunition containers are fed into the tank by conveyer, which sharply reduces the ammunition loading time. Thus judging from reports in the foreign press, a complete ammunition load can be loaded within 15-20 minutes, which is about a third of the time required for Leopard-1 and AMX-30 tanks. The hatches are also intended for the crew's emergency egress. However, this possibility is excluded if the tank is carrying extra ammunition containers.

Presence of large rear hatches and the dimensions of the Merkava's hull, which are even larger than the M60, served as the grounds for reports in the foreign press that on the battlefield, in addition to the crew it can carry a squad of infantry. Fuller acquaintance of foreign specialists with its design revealed that the tank is not really intended to carry infantry, since the rear compartment of the hull is too low and too small. However, it has been noted that this compartment can house, in place of part of the ammunition, up to four casualties or stretchers or several foot soldiers, albeit uncomfortably.

Discussing the layout of the Merkava tank, foreign specialists emphasized that the design takes meticulous account of ergonomic requirements on the location and equipment of crew work stations, as governed by the climatic conditions of the theater of military operations and by the need for making it easy for new recruits and reservists to learn how to operate the vehicle.

Much attention was devoted during development to insuring the required level of protection to the tank, and especially to its crew. It was for this purpose that the engine-transmission compartment was located in front and isolated from the fighting compartment by an airtight armored partition. Combined and staggered armor is used extensively in the design of the hull and turret.

The hull is made of cast and rolled armor parts. The front end is steeply sloped and very thick. Moreover the protective features of the front parts of the hull are intensified by selection of the appropriate filler for combined armor. The upper sides are protected by main and auxiliary armor, resulting in a staggered design. Air cleaners, the filtered ventilation system providing protection against mass destruction weapons, storage batteries and some other components which, if damaged, would not put the tank out of action immediately, are located between the outer and inner armor plates in sponsons above the tracks. According to some information in the foreign press, diesel fuel is also stored between the main and supplementary armor of the Merkava tank. The sides and certain components of the tracks and suspension are protected by removable armor plates resistant to hollow-charge ammunition.

The tank turret is welded. In comparison with other foreign models, its frontal projection is sharply reduced. The cast armor parts of the front section are highly angled and down-turned. The turret's armor (weighing a total of about 7 tons) consists of five parts: an inner shell, two side castings, a top and a recess. In the front part of the turret, between the two armor walls, each of which is about 76 mm thick, a gap of about the same

dimensions is left. Additional protective elements may be mounted or machine-gun cartridges may be stored in it.

Much attention is devoted to reducing the effect shells striking the tank have on the space enclosed by the armor. A fire extinguishing system with a sufficiently short response time is used for this purpose. It turns on in response to signals from infrared sensors picking up the first signs of a hydrocarbon flame. Within just 60 msec, inert Freon 1301 compound is fed into the danger zone, preventing ignition and explosion of fuel (it ignites about 100 msec after a hollow-charge jet strikes the fuel tank).

To raise the tank's resistance to mines, its floor has a U shape.

Evaluating the protection afforded by the Merkava tank, foreign specialists emphasize that on the whole it is significantly greater than that provided by other tanks possessed by the Israelis, and that this degree of protection is achieved primarily through sensible distribution of armor material, a new layout, use of staggered and combined armor and selection of the appropriate filler.

The main piece of armament is the M68 105-mm rifled gun, produced in Israel on the basis of an American license. It is paired with a 7.62-mm machinegun. One or two machineguns of the same caliber are also mounted on the top of the turret. The ammunition load of the gun includes subcaliber, hollow-charge, high-explosive fragmentation and smoke shells. A new more effective 105-mm fin-stabilized subcaliber projectile was recently created. The gun has a heat insulating jacket on its barrel and a system that allows the crew to adjust the weapon without leaving the vehicle. Its maximum angle of elevation is +20°, while its angle of depression is only -8.5° owing to the forward location of the engine-transmission compartment and rearward displacement of the turret.

The fire control system includes a two-plane armament stabilizer, a laser range-finder and an electronic ballistic computer (Figure 3). There are redundant controls at the tank commander's station for the main armament. Much attention is devoted to observation instruments, including those intended for night-time use. The tank is equipped with Israeli-produced navigation instruments.

Evaluating the firepower of the Merkava tank, foreign specialists emphasize that owing to good protection, it can fire from shorter range than other tanks, which makes the armament highly effective, while the large ammunition load makes it possible for the tank to engage in a long fire fight.

In terms of mobility, the Merkava tank is significantly inferior to tanks such as the Leopard-2 and the Abrams; however, it is superior to all other models possessed by Israeli ground troops. It has a 12-cylinder air-cooled diesel engine made by Teledyne Continental (the same as in an American M60 tank, though it is additionally supercharged) and an Allison hydromechanical transmission. Air is fed into the engine from the fighting compartment or

through a special air intake grid in the right front sponson situated above the tracks. Exhaust pipes extend out from both sides. Engine cooling air is fed in through a special grid (in the top front, above the left track).

The suspension and tracks of the tank are planned in such a way that it would have a sufficiently high average speed both on level and mountainous terrain. There is an independent spring suspension. It allows the roller a dynamic play of 210 mm. The tank has six road wheels and three top rollers on each side. Hydraulic shock absorbers are mounted on the front and rear road wheels. The track (which consists of 112 track links) is the same as on the Centurion tank.

Judging from reports in the foreign press, the Merkava tank is undergoing continual improvement as it is being produced, which is why the modified Mk1 being produced today differs significantly from the first series-produced models. The modernization plans call for producing the Mk2 modification, which differs mainly in providing better protection and exhibiting higher mobility. Tests have been started on the Mk3 modification, which may be adopted in the 1990s. There are plans for installing a more-powerful diesel or gas turbine engine and a hydropneumatic suspension in this tank, and for improving its protection. Specialists feel that a gun of higher caliber, 120 mm for example, could be installed on it as well.

Infantry is transported primarily by American M113 tracked armored personnel carriers. Most of these vehicles have undergone modernization (they were given the name Zelda), in the course of which the locations of the engine exhausts were changed so that the exhausts would be vented rearward and would not get into the passenger compartment when the vehicle traveled with open hatches. Four 7.62 or 12.7 mm machineguns were mounted on the top of the hull.

The Israeli ground troops still possess many half-track armored personnel carriers purchased from the USA in the 1950s. An American 172 horsepower diesel engine has now been installed in them. In addition to carrying infantry, these APCs are used as command-and-staff vehicles, ambulances and transport vehicles, as well as a self-propelled chassis for mortars, antiaircraft guns, recoilless weapons, 90-mm antitank guns and antitank guided rockets.

Since the early 1970s Israel has been producing a light wheeled (6 × 4) RBY Mk1 reconnaissance vehicle. Its hull is welded out of armor plates 8 mm thick. The carbureter engine is located aft. The vehicle exhibits sufficient cross-country capability over rough ground, and it is armed with machineguns. In addition to two crewmembers it carries six soldiers with all of their gear. An EL/M 2106 airborne target detection radar, used by antiaircraft subunits of the ground troops, may be mounted on it as well (Figure 4).

The Nimda [transliteration] company recently designed a wheeled (6 × 6) armored vehicle, the Shoet (Figure 5). It is intended for reconnaissance and patrols, and it is also used as an armored personnel carrier, a self-propelled mortar,

a command-and-staff vehicle, an ambulance and an evacuation vehicle. The lower front armor plate is 14 mm thick to provide protection against mines. An American diesel engine and a hydromechanical transmission are installed in the Shoet. The vehicle is equipped with night vision instruments and radio communication resources. Up to four machineguns are mounted on the top of the hull.

On the whole, foreign military specialists feel that despite the diversity of brands and presence of a large number of obsolete vehicles, Israeli armored equipment is being maintained at a rather high degree of combat readiness.

11004
CSO: 1801/066

FIGHTER COMBAT FORMATIONS ANALYZED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 41-46

[Article by Col V. Dolbnya, Cand Mil Sci: "Tactical Fighter Combat Formations"]

[Text] Military experts of the USA and its allies in the aggressive NATO bloc feel that the effectiveness of tactical fighters performing combat missions depends in may ways on correct choice of the combat formations of groups of airplanes of different composition--from single pairs to large formations. Using American terminology, a combat formation is defined as arrangement of airplanes (groups) in the air in a certain fashion to create conditions permitting continuous control and coordination and to achieve the best results in the performance of combat missions.

Judging from reports in the foreign press, the pair and the flight are the basis for organizing groups of whatever composition. Depending on distances and intervals as well as the height difference between combat formations of airplanes (groups), they are subdivided into closed, open and dispersed formations which, considering the phase of flight and the situation, may be conditionally referred to as precombat and combat formations.

In a closed combat formation, identical flight parameters and minimum permissible intervals, distances and height differences between airplanes (groups) are established. This combat formation is usually employed when flying over friendly territory (in the absence of enemy action).

In an open formation, the flight parameters are still kept the same, but the distance between airplanes (groups) increases to the limits of visual or radar visibility. This formation is usually used when hunting for ground, sea and air targets, and when it is necessary to approach a target and strike it in succession, with regard to information on the results of the actions of preceding airplanes (groups).

In dispersed combat formations, the flight parameters of the airplanes (groups) may be different, and visual contact between them may be absent. Such formations are used at night and when flying in clouds during daytime by airplanes carrying long-range weapons and making their strikes from ranges exceeding visual contact with the enemy, as well as when operating within the composition of units and formations.

Precombat and combat formations are assumed by tactical fighters as they approach the target and strike it (in the course of aerial combat). They are formed up in such a way as to insure maximum possible freedom of maneuver, the best coordination and effective use of the weapons mounted on the fighters; such formations are also employed with the purpose of confining the possibilities of maneuver and reducing the effectiveness of an airborne opponent or his ground antiaircraft resources.

The typical forms of combat formations are "column," "front," "bearing" and "wedge."

Foreign specialists believe that the choice of combat formation is determined primarily by the nature of the mission and the specific situation in the area of combat operations. However, it is emphasized in the foreign press that as a rule, it is impossible to account for these factors fully, since a number of other requirements must also be satisfied in any mission. In particular, the American journal MILITARY REVIEW carried an article stating that in the general case, the combat formation must: preclude the possibility of enemy fighter groups penetrating into the formation; permit swift concentration of the airplanes to achieve a superiority within a certain sector (direction); minimize the time it takes to make a strike on the enemy, so as not to expose the airplanes to the target's antiaircraft fire for a long period of time; insure freedom of maneuver of groups and airplanes for the purposes of reorganizing and evading antiaircraft fire; eliminate the danger of collisions between the airplanes during maneuver.

In the opinion of Western military experts this list includes far from all of the general requirements that are imposed on the combat formations of airplane groups representing all branches of aviation, and tactical fighters in particular. But this list is sufficient to persuade us that the requirements are contradictory, and some are even incompatible. This is why many specialists in the NATO countries are attempting to reduce the combat formations of tactical fighters to two variants, determined by the way weapons are employed against ground and air targets. At the same time, they note, the weapons are employed in the principal phase of flight--when attacking a target, and during this time the main requirement of the combat formation is to insure highly effective use of weapons and protection of the attacking airplanes from counterattacks by enemy fighters. In other phases, other requirements assume the forefront. As an example the main requirement during target search is to allow a possibility for observing the largest airspace, which would make it possible to reveal a potential target or attacking enemy fighters promptly and, when surmounting the enemy's land-based antiaircraft resources, to preclude or maximally reduce airplane losses, and so on.

Foreign military experts feel that the combat formation of tactical fighters must be varied deliberately or obligatorily depending on the situation (for example airplanes having the mission of striking ground targets may have to engage enemy fighters attacking them), on the nature of the missions and on the methods of fire. The combat formations of the pair, the flight and the squadron of tactical fighters executing typical combat missions in different phases of flight are illuminated below on the basis of information published in the foreign press.

Combat Formations of the Pair and the Flight When Flying To and Searching For a Target

The basic factors considered in the choice of the parameters of a combat formation in these phases of flight include the technical specifications of onboard radar sets, the armament of one's own airplanes as well as of enemy fighters, and the possibility for visual observation of the airspace (the latter depends on the time of day, the weather and the design of the cockpit canopy). In the opinion of foreign specialists the selected combat formation must insure prompt detection of the airborne enemy, so that the airplanes could perform a defensive maneuver before the enemy is able to assume an advantageous position for attack.

In order to create better conditions for observation of the rear hemisphere, the tactical fighters must be organized in the appropriate fashion, and particularly by increasing the number of airplanes in the "front" combat formation (Figure 1A). Owing to this, the number of crewmembers that can keep the rear hemisphere under visual observation rises, which in turn increases the probability of detection of attacking enemy fighters. The width of the strip of ground surface and of the airspace corridor along the flight route are widened as well. However, this disposition of the airplanes limits their freedom of maneuver. To eliminate this shortcoming, in the opinion of foreign experts the combat formation should include as few aircraft as possible. This conditions is satisfied to the greatest degree by the "column" formation (Figure 1B).

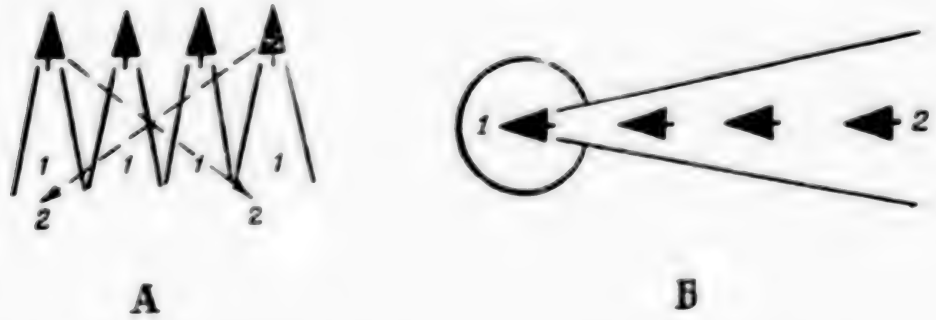

Figure 1. Fighter Combat Formations: A--"front" (1--blind zone, 2--visual cover); B--"column" (1--leader's zone of observation, 2--leader's blind zone)

Foreign specialists believe such a deeply disposed combat formation to be advantageous to tactical fighters flying at low altitude. However, in this case the distance between the airplanes (groups) increases, which helps the crews to monitor the distance to the ground surface and to observe one another, and it permits them to concentrate attention on target search in the front hemisphere. It is noted that the distance between airplanes must also be increased when going around obstacles, when the crews must perform the same maneuvers successively one behind the other.

Judging from reports in the foreign press, this tactical fighter formation was typical of Israeli aviation operating in mountainous terrain at minimum safe altitudes (in the wars of the Near East).

From the viewpoint of West European specialists the combat formation must be limited to four airplanes in order to maintain sufficient maneuverability and dependable coordination within the combat formation. On this basis the air forces of most NATO bloc countries do their flight training in groups of tactical fighters consisting of two (a pair) to four aircraft (a flight). These units are the basis for creating the combat formations of air subunits and units.

The combat formation of a pair is given in polar coordinates relative to the leader: The angle of sight, the interval and the height difference are given. The pair of airplanes is referred to in the foreign press as an "element," thus emphasizing its rudimentary nature in combat formations. It is more maneuverable than a flight. Absence of sufficient possibilities for prompt detection of enemy fighters is believed to be its weak point. This is why a pair of airplanes engaged in target search must spread apart enough to permit observation of a greater portion of the airspace, so that enemy fighters could be detected before they launch their missiles. As the flying altitude increases, the interval between airplanes rises (it varies depending on the possibilities the pilots have for observing the rear hemisphere, which depends primarily on the canopy design). In this case the leader of the pair must spend more of his time observing the rear hemisphere, rather than searching for potential targets, and this reduces the offensive possibilities of tactical fighters.

The follower is obligated to clearly know his place in the formation when performing various maneuvers. Prior to the initial contact with the enemy during search, he must assume a position corresponding to an angle of sight from 0 to 20° (American specialists reckon it from the perpendicular to the axis of the leader's airplane to the "leader-follower" axis), given an interval of 750 m and a low flying altitude--that is, the airplanes should travel in a "front" formation. In order to keep his place in the formation while turning, the follower may locate himself on either the outer or the inner side of the turn. To make it easier for him to keep his place in the combat formation, conserve energy and improve visual observation of the airspace, the follower must maneuver in the horizontal and vertical planes. For example if the leader turns in the direction of the follower, the latter increases or decreases his altitude and shifts to the outer side. This makes it possible to reduce the horizontal angular velocity of the turn and thus make it easier to maintain the formation.

Western experts feel that the combat formation of a three-aircraft flight provides for good observation of the airspace when flying a straight run or during target search; however, experience has shown that such a combat formation limits the possibility followers have for keeping their place in formation during fluid aerial combat.

The combat formation of a four-aircraft flight, the foreign press states, permits observation of a large portion of the airspace, and it provides for

maneuver, for coordination between the crews and for concentration of fire in the direction of attack, if this is necessary.

When flying a straight run and when searching for a target, the follower pair travels in a "front" combat formation relative to the lead pair, maintaining an angle of sight from 0 to 20°, and an interval of 900-2,700 m at low altitude, (the "running four," Figure 2). As altitude increases, the interval grows, but only to the limits of visual observation (3-5 km) while when contact is maintained with onboard radar, this interval may be up to 5-7 km. In this case the pairs are staggered 300-1,500 m in altitude.

Figure 2. Combat Formation of the "Running Four" ("front of pairs"): Above--back view, below--top view

Foreign specialists feel that such an open formation of a flight of four aircraft provides good possibilities for observing the airspace and for maneuver. During an energetic turn, to avoid separation of the airplanes and to maintain its position in the formation, the follower pair can maneuver in both the vertical and horizontal plane. Given such freedom of maneuver, the pilots of the follower pair would expend less time and effort to keep their place in the combat formation, and they would devote more attention to observing the airspace.

The parameters describing the disposition of the pairs of a flight with respect to altitude are selected depending on the nature of the ground surface and the visibility, though in any case visual contact must be maintained between the pairs and between airplanes in pairs.

As a rule, a flight of tactical fighters maintains such a combat formation during independent search for airborne targets (without guidance from the ground).

The forms of combat formations examined above are particular cases, and they are employed in relatively good weather and in a tactical situation that is not complex. In other cases combat formations satisfying the requirements of the main combat missions are employed. Thus foreign specialists feel that a compromise must be made, the degree of which is determined by the situation. This

compromise takes the form of a "wedge of airplanes" combat formation (Figure 3) for a flight, and "front" or "bearing" formation for a pair operating both independently and within the composition of a group.

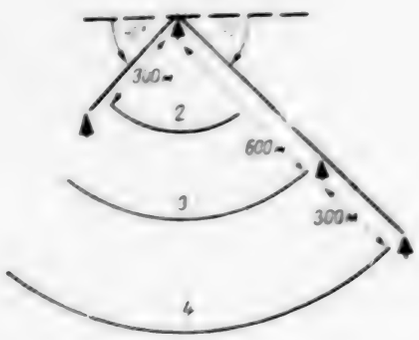

Figure 3. "Wedge of Airplanes" Combat Formation of a Flight: 2, 3, 4--zones of maneuver of the second, third and fourth airplanes relative to the leader

Every crew flying in formation is given a sector of responsibility in which it must search for air or ground targets.

Combat Formations Used When Surmounting Air Defenses

Foreign experts feel that airplanes attempting to break through the enemy's ground antiaircraft forces and resources can weaken their effect by assuming a sensible combat formation, by taking evasive action and performing anti-missile maneuvers, and by using electronic suppression resources against the control systems of antiaircraft missile complexes and antiaircraft artillery batteries.

In their opinion the following factors should be accounted for and utilized when organizing the combat formation: the possibility of observing the airspace, the need for avoiding obstacles and terrain following, and the convenience of performing maneuvers and maintaining coordination.

Judging from reports in the foreign press, these conditions are satisfied most fully by the "bearing" combat formation for the pair and the "wedge" formation for the flight, as described above. However, when the airplanes are carrying electronic countermeasures pods intended for protection against antiaircraft resources, these formations must be transformed somewhat. The optimum distance between airplanes in this case is 460 ± 150m, while the elevation difference between them should be 150-300 m (Figure 4).

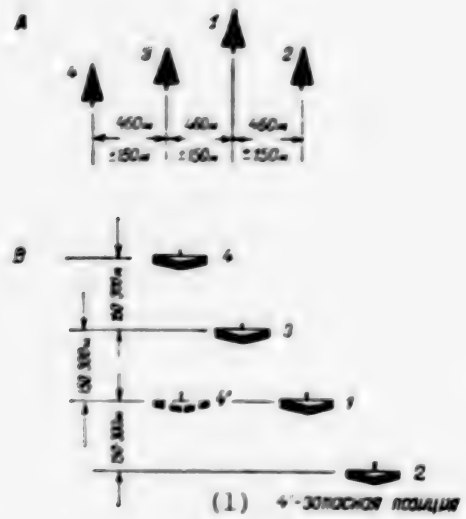

Figure 4. "Wedge" Combat Formation of a Flight Penetrating Enemy Air Defenses: A--bottom (top) view, B--front view

Key:

1. Alternative position

Combat Formations in the Target Area

When tactical fighters operate in large groups, a group consisting of not more than a flight may simultaneously attack a ground target from one bearing. Thus during combat operations of American aviation in Vietnam, flights of tactical fighters performing the role of strike groups (or representing part of such groups) maintained a "wedge of airplanes" combat formation en route to the target. Each flight reorganized itself into a "column of pairs" 5-6 km from the start line. These pairs approached the object of the strike independently from different directions. In the opinion of NATO specialists this tactic is typical of group actions against ground targets.

At night and in adverse weather, tactical fighters approached their target in pairs or as lone airplanes as a rule. It was noted in some foreign journals that groups of up to four airplanes have struck ground targets under such conditions (the targets were illuminated by aircraft flares).

Combat Formations During Aerial Combat

In the interpretation of the U.S. Air Force's manuals and regulations, during aerial combat the combat formation must provide cover to the group of airplanes against the airborne enemy, and it must be able to conduct offensive actions against enemy bombers and fighters.

It was written in the west German journal TRUPPENPRAXIS that in aerial combat, the mission of the leader is to attack, while that of the follower is to keep his place in the formation, to maintain observation, and to inform and support

the leader. The pair must maneuver in offense and in defense as a single whole; the airplanes may separate only in exceptional situations (for example when breaking off from an attack or when evading a missile). However, the follower pilot is now allowed greater initiative in selecting his maneuver--that is, he is permitted to change the parameters of the pair's combat formation going as far as temporarily breaking visual contact between the crews. Depending on the situation, even the functions of the crews may change: The leader may become the follower, and vice versa.

It has been noted in other publications of the foreign press that in anticipation of meeting an airborne target, tactical fighters must be ready to attack it with missiles or guns, on the move without additional reorganization. For this purpose the pair must have the possibility for launching missiles simultaneously--that is, the airplanes must travel in a combat formation permitting such launching. The requirement imposed on the formation in this case is that of safeguarding the leader from missiles launched by his follower. In particular when missiles with infrared homing heads are employed, it is recommended that the leader locate himself outside the lock-on zone of the follower's missiles. In the opinion of foreign specialists this requirement is best satisfied by the "front" or "bearing" combat formation. The latter is the most acceptable, since it does not require reorganization for subsequent fluid aerial combat, but its parameters must be carefully checked.

In successive attacks against an airborne target, the combat formation of a pair must be dispersed in depth in such a way that the follower reaches the limit of opening fire after the leader has turned away from the bearing to the target and is flying at an angle that would insure his safety in relation to the follower's weapons. The size of this angle depends on the type of weapon employed and its technical specifications.

When fluid aerial combat begins, U.S. Air Force regulations state that the follower loses his freedom of action and is compelled to remain behind the leader within the limits of the zone of safe maneuver (the "fighting wing," using American terminology)--a space for maneuver in which conditions favoring maintenance of the combat formation and visual observation of the airspace can be achieved. This zone is a cone 300-400 m high with a solid apical angle of 30-45° (Figure 5). In order to maintain his position within it, the follower must use the same maneuver procedures employed during patrol (search). His main mission is to keep the rear hemisphere under observation, while the leader concentrates his attention on maneuvering for the purpose of gaining advantage over the enemy.

A flight of tactical fighters maneuvering at high acceleration breaks up into pairs, which operate in accordance with the procedure described above, maintaining fire or tactical coordination.

According to the Swiss journal INTERAVIA, maximum utilization of the combat capabilities of fighters is achieved in combat by dispersing the combat

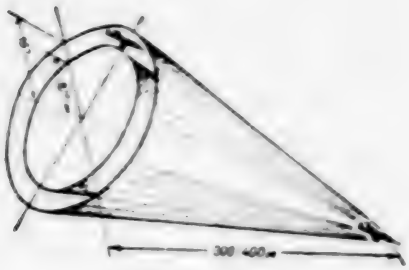

Figure 5. Zone of Safe Maneuver for the Follower Airplane

formations of the subunits in altitude, depth and front. The first makes it possible for crews in the lower echelon to use onboard radar to search for airborne targets and for crews in the upper echelon to perform all types of descending maneuvers aimed at foiling a surprise attack by the enemy or supporting the lower echelon. Owing to dispersal in depth and on the front, better conditions are created for different airplanes in a group to use their air-to-air missiles and guns against the same target; this somewhat compensates for the limitations imposed by the minimum launching range of missiles and their insufficient effectiveness against an energetically maneuvering target.

(To be concluded)

11004
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NATO CONVERTS CIVILIAN AIRPLANES INTO MILITARY TANKERS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 46-47

[Article by Col Yu. Okunev, Cand Tech Sci: "Conversion of Civil Airplanes into Tankers"]

[Text] One of the important ways of increasing the combat capabilities of military aviation, the leadership of the aggressive NATO bloc believes, is to enlarge the tanker fleet. It believes that this problem can be solved by equipping military transport and civilian passenger airplanes with air-to-air refueling systems.

Great Britain was the initiator of this effort (though not without prodding from across the ocean). Its air force, which possesses 23 Victor-K.2 tankers, is implementing a supplementary program of reequipping five VC-10 transporters and four Super VC-10 transporters into the VC-10 K.2 and VC-10 K.3 tankers respectively. They are intended for aerial refueling of Lightning and Phantom fighters and other warplanes, including the latest, the Tornado. But even before completion of the program mentioned above, highly placed English military officials are declaring that Great Britain will not stop at this, that it intends to reequip, as tankers, the rest of the VC-10 transporters possessed by the air force and the necessary number of civilian air liners, and to train their crews in air-to-air refueling of warplanes.

According to the Western press there are more than 2,300 warplanes equipped with air-to-air refueling systems in NATO's combined air forces in Europe. However, in the opinion of American military experts the 32 tankers in the RAF (including nine VC-10 K.2 and K.3 tankers) and the 11 KC-135F tankers in the French air force are clearly not enough to insure "adequate combat readiness." Quite understandably, these experts found this "inadequacy" to lay primarily with the European members of this bloc. In their estimation the allies lack 346 tankers (using a ratio of one tanker to six warplanes). In this case 181 of them must be outfitted with air-to-air refueling systems employing a telescopic pipe, while 165 must use a flexible hose.

In order to satisfy the "need" of its partners in the bloc for these airplanes as quickly as possible, the USA has proposed that they modernize the necessary quantity of transporters, so that they could be used as tankers if necessary. On this basis America's Boeing developed plans for reequipping, as tankers,

Boeing 737 passenger liners, of which there are over 140 in the West European countries, and the new Boeing 757. The plan in this case is to outfit them with a single refueling unit suspended from the fuselage--the 32/280 manufactured by Flight Refueling or the 1080 unit produced by Beach, and the fuel system of each aircraft is to be modernized appropriately.

Characteristics of 737-KX 150 and 757-KX 152 Tankers

(1) Характеристики	737-KX-150		757-KX-152
	(2) в варианте с дополнительными баками емкостью 12 000 л	(3) в варианте без дополнительных баков	
(4) Вес, кг:			
(5) максимальный взлетный	52 600	41 500	85 100
(6) пустого	28 000	25 900	53 000
(7) Запас топлива, л:			
(8) суммарный	31 500	19 500	
(9) максимальный для перекачки в воздухе	20 700	8600	20 700
(10) Режим полета при дозаправке:			
(11) высота, м	9000	9000	9000
(12) скорость, число М	0,7	0,7	0,8
(13) Количество отдаваемого на определенном рубеже (км) топлива, кг:			
830	10 000	6650	20 700
1000	15 000	6650	19 200
1500	11 500	4000	15 500
2000	8660	1350	11 500
2500	5460	—	7500
3000	2800	—	4200

Key:

1. Characteristics
2. In the variant with additional tanks with a capacity of 12,000 liters
3. In the variant without additional tanks
4. Weight, kg
5. Maximum take-off
6. Empty
7. Fuel reserve, liters:
8. Total
9. Maximum for air-to-air refueling
10. Refueing flight conditions:
11. Height, m
12. Speed, M
13. Quantity of fuel dispensed from a particular range (km), kg:

The tanker based on the Boeing 737 (code-named the 737-KX-150) is to be designed either in a variant with additional fuel tanks in the passenger cabin (three with a total capacity of 12,000 liters--or four with a capacity of 15,500 liters), or in a variant without them, using just the airplane's main tanks. Installation of additional fuel tanks in the Boeing 757 (757-KX-152) is not foreseen; instead, fuel will be pumped directly out of its built-in tanks. In this case part of the refueling equipment is to be installed permanently within its cargo and technical compartments, in the nose cabin and in the passenger compartment (just prior to its exit as a result

Calculated characteristics of the 737-KX-150 and the 757-KX-152 published in the foreign press are given in the accompanying table. The efforts to re-equip passenger and cargo liners into tankers and the measures being planned in this area once again prove that civil aviation of the countries of the aggressive NATO bloc is being tied increasingly closer to the war machine.

11004
CSO: 1801/066

PRINCIPLE OF OPERATION, CHARACTERISTICS OF FUEL-AIR AMMUNITION ANALYZED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 48-53

[Article by Engr-Col V. Dmitriyev: "Fuel-Air Ammunition"]

[Text] A. D. Vorob'yev, S. N. Men'shikov, Ye. Yu. Pichugin and many other readers of our journal have requested information on fuel-air ammunition. Their request is satisfied below.

The course presently followed by the American administration toward all-out increase of the USA's military potential foresees further improvement and development of both nuclear and conventional weapons, including those which, in the designs of Pentagon strategists, should significantly raise the fighting power of the armed forces. Among the new forms of conventional weapons, the foreign press includes fuel-air ammunition (sometimes referred to as volume-detonating), comparable with low-yield nuclear ammunition in terms of the destructive effect of the shock wave.

Examining the principle of operation of fuel-air ammunition, Western specialists make a certain analogy with accidental explosions that sometimes occur in chemical industry enterprises, elevators, granaries, subterranian shafts, in storage facilities containing flammable chemicals and volatile substances, and when transporting such substances by different forms of transportation. In both cases the mechanism behind the explosion is the same--formation of an aerosol mixture of volatile gaseous, liquid or solid (in the case of powder suspensions) substances with a rather high calorie content that ignite spontaneously or by means of detonators (in fuel-air ammunition). In this case under certain conditions that depend primarily on the concentration of the substances in air (this is particularly true of hydrocarbon fuels) and on a number of physicochemical properties and complex gas-dynamic mixing and combustion processes, a detonation process taking the form of an explosion may arise in such a fuel-air cloud, causing significant destruction.

Judging from reports in the foreign press, the main destruction factor of fuel-air ammunition is the excess pressure in the shock wave front, which attains about 30 kg/cm^2 in the center of a fuel-air cloud that has undergone detonation, while in the detonation zone, a temperature of 2,500-3,000°C develops within several dozen microseconds. The parameters of the excess

pressure generated in the shock wave front (the time of its attenuation inside and outside the cloud) exceed those of the pressure generated in the shock wave front created by conventional high explosives (Figure 1). Outside the cloud, the shock wave spreads as drawn-out areas of compression and expansion at a velocity of 1,500-3,000 m/sec, and at a distance of 100 m the excess pressure in the shock wave front may be 1 kg/cm^2.

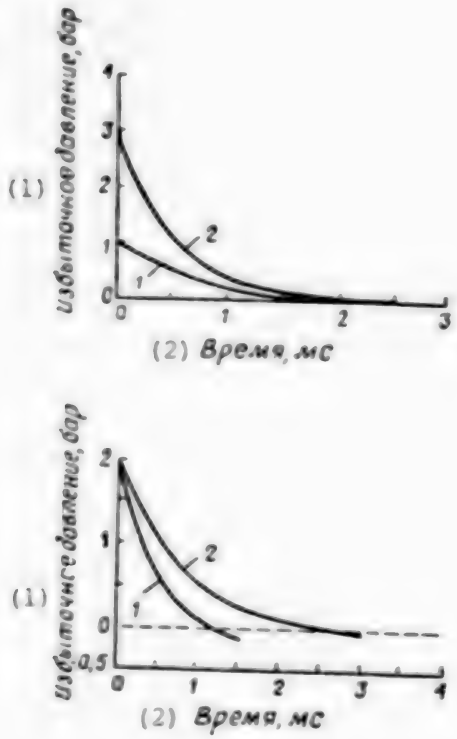

Figure 1. Graphs Comparing Attenuation of Excess Pressure Created by Explosion of a Conventional High Explosive (trinitrotoluene) and a Mixture of Ethylene Oxide and Air (above--within the cloud, below--outside the cloud): *1*--trinitrotoluene; *2*--fuel-air mixture

Key:
1. Excess pressure, bar
2. Time, msec

It has also been reported that inasmuch as a fuel-air mixture is capable of penetrating into unsealed spaces and following the contours of the terrain, neither folds in the terrain nor field defensive structures can offer protection against the destructive effect of detonated fuel-air ammunition. Moreover, on entering closed spaces through the ventilation intakes of fortifications or through open windows of buildings, fuel-air mixtures enjoy more favorable conditions for development of the detonation process, and they are capable of destroying the load-bearing structures of these installations and putting them out of commission.

According to foreign military experts these properties of fuel-air ammunition make it possible to classify such weapons as being effective against unsheltered and poorly protected manpower, combat equipment on open ground, fortifications and defensive structures; it can be used to create passages through minefields, to clear and prepare areas as temporary drop zones and helicopter landing pads, to destroy buildings and suppress strongpoints during street fighting in a city, to combat antiship missiles and surface ships, to destroy vegetation and agricultural crops and so on.

The first TOE fuel-air ammunition was created in the USA in 1969-1971 and used in the aggressive war that American imperialism had been waging at the time in Southeast Asia. The charge of such ammunition consisted of liquid hydrocarbon fuels at normal or high pressure, including ethylene or propylene oxide, methane, propylnitrate, MAPP mixture and others (the combustion characteristics of some of these compounds are shown in the table below).

Combustion Characteristics of Some Fuels

Compound, Chemical Formula	Minimum ignition point, °C	Combustion temperature	Incendiary composition (percent by volume)
Ethylene oxide (otherwise known as ethylether, T-gas, oxirane), CH_2CH_2O	-18	440	2.6-100
Acetylene peroxide (diacetylene peroxide), $(CH_3CO)O_2$*	44.5	-	-
Diborane (boron hydride), B_2H_6 . . .	-90	40-50	0.9-93
Dimethylhydrazine (hydrazomethane), $CH_3NHNHCH_3$	1	300	2-95
Methane, CH_4	-650	595	5-15
Propylnitrate, $CH_3CH_2CH_2ONO_2$ . . .	20	117	-

* Explodes when heated.

MAPP mixture contains saturated and unsaturated hydrocarbons. One of its typical variants includes 18 percent propane, 7.4 percent propylene, 10 percent normal butane, 26.1 percent propadiene and 37 percent methylacetylene, as well as not less than 1 percent ethane, cyclopropane and unsaturated butanes. This

mixture is manufactured by America's Dow Chemical, which earned unenviable glory from its deliveries of so-called Agent Orange to the Pentagon, which was used extensively by American aggressors in Vietnam. In view of the presence of highly toxic dioxine, it was a long-acting chemical weapon, and it was prohibited by the appropriate international conventions as a barbaric resource of armed conflict.

A typical example of the first fuel-air ammunition (it is referred to as first-generation ammunition in the Western press) is the 500-pound CBU-55 cluster bomb (Figure 2 [not reproduced]), which was adopted by U.S. marine aviation as well as by army and tactical aviation in 1969-1971. This cluster bomb was dropped from light subsonic A-37 and OV-10 airplanes and UH-1 helicopters at an altitude of about 600 m and a velocity of 120 km/hr. The cluster (it contains three BLU-73 bombs) has the following characteristics: total weight 235 kg, charge (liquid ethylene oxide) in each bomb--32.6 kg, and in one bomb--45 kg, diameter of the lethal area of one bomb--100 m, cluster length--2,285 mm, housing diameter--356 mm, span of tail fin--712 mm, suspension base--356 mm.

A detonating cord which, when broken, causes the cluster to break apart in the air, extends along the side of the cluster housing from the fuse hole to the bottom plate. After breaking away, each of the three bombs (ethylene oxide containers) falls beneath an individual braking parachute, reducing the rate of descent to 33 m/sec at ground surface. When the bombs hit the ground, a percussion fuse detonates a bursting charge located along the long axis of the container. As a result the ethylene oxide is atomized, and a fuel-air cloud with a diameter of 15-17 m and a height of 2.5-3 m is formed.

The fuel-air cloud is detonated by detonators 125 msec later, at a height of about 1 m. If the cloud is of a sufficient concentration ($1 \cdot 10^{-3} - 3 \cdot 10^{-3}$ gm/$/cm^3$) and if the size of the ethylene oxide droplets is about 1 mm, the detonator ignites the mixture, forming a shock wave that propagates at supersonic speed. According to information in the foreign press, if the detonation process proceeds normally, the excess pressure in the shock wave front (15 m from the center of the fuel-air cloud) attains almost 29 kg/cm^2, which can completely destroy even dense vegetation over an area with a diameter of 30 m.

In 1971 a modification of this cluster bomb was created and designated the CBU-72. It can be dropped by high speed airplanes such as the A-4, A-7 and F-4. The cluster bomb is equipped with an additional braking parachute that reduces its descent to a velocity at which the unit can open and the individual BLU-73 bombs could continue descending independently.

In addition to these cluster bombs, for which the U.S. Navy was the main customer, fuel-air ammunition was also developed during this period for other branches of the armed forces. Thus BLU-72 and BLU-76 fuel-air small-caliber bombs loaded in clusters and intended for use by subsonic and supersonic airplanes respectively, were created for the air force within the framework of the "Pave Pat" program (Figure 3 [not reproduced]). Their charge consisted of ethylene oxide (32.5 kg), and the detonation delay following atomization and formation of the fuel-air cloud may be about 4 sec. The MADFAE system (consisting of up to 12 fuel-air bombs mounted on CH-46, CH-53 and UH-1

helicopters), intended for the clearing of passages through minefields, was created for marine aviation. The bombs could be dropped simultaneously, singly or in succession. The maximum length of a minefield passage is about 300 m.

Combat experience and the results of numerous tests permitted assessment of the effectiveness of first-generation fuel-air ammunition and revelation of its shortcomings. In particular, American specialists felt one of the most serious shortcomings to be the significant dependence of the effectiveness of the ammunition on observing the bombing procedure and on weather, both of which directly influence formation of the fuel-air cloud. If the fuel concentration, which depends on a number of factors, including meteorological factors (ambient air pressure, humidity and temperature, presense of wind etc.), is not optimum, or if detonation is initiated at the wrong time, simple burning may occur in the cloud rather than detonation.

One design shortcoming revealed in BLU-73 bombs is their limited combat application at negative temperatures. In particular, it was established that at temperatures below -7°C, the ethylene oxide undergoes volumetric compression, which results in formation of empty spaces within the container and exposure of the bursting charge. As a result a fuel-air cloud with a non-optimum concentration may form, causing reduction of combat effectiveness.

Considering the accumulated combat experience and the results of tests on fuel-air ammunition, in the first half of the 1970s the USA initiated an extensive program of theoretical research on detonation of fuel-air mixtures, and of practical design of second-generation ammunition of this sort. This program consisted of two basic directions: creating the theoretical principles of optimum formation of a fuel-air cloud and the mechanism of its detonation, reducing the dependence upon meteorological factors, and insuring maximum combat effectiveness; searching for new higher-calorie fuels and creating powerful ammunition capable of generating excess pressure of up to 100 kg/cm^2 in the shock wave front.

It is noted in the foreign press that a special computer model called DICE-FAE was created in 1975, permitting computer simulation of processes such as formation of the fuel-air mixture, the dynamics of liquid fuel droplet formation in air in response to aerodynamic forces, and detonation of the fuel-air cloud. This model was used, as an example, to study and simulate these processes in the BLU-73 bomb; in this case for practical purposes the results were consistent with the parameters measured during experimental detonation of similar fuel-air ammunition with an ethylene oxide charge.

Thus it was revealed that after the bursting charge goes off, ethylene oxide atomizes into a cloud 3 m high with a radius of 6 m. In this case the air turbulence caused by explosion of the bursting charge causes formation of ethylene oxide droplets as follows: In 10 msec all droplets with a diameter less than 10 mm break up into droplets with a diameter of 0-2 mm, and after 30 msec, when the fuel-air cloud is detonated by the detonator (in this case the weight of high explosive in the detonator must be not less than 350 gm), up to 90 percent of the ethylene oxide in the cloud exists as droplets with a diameter of 0-2 mm. At this moment a detonation wave arises in the cloud, causing

evaporation of the ethylene oxide droplets and their combustion until complete consumption of the fuel or atmospheric oxygen. Evaporation of small droplets proceeds between the 60th and 63rd microsecond, the detonation process comes to its conclusion by the 67th microsecond, and complete combustion of fuel in air occurs by the 77th. On the whole, of the 32.6 kg of ethylene oxide, 27 kg (83 percent) are consumed in detonation, 1.35 kg (4 percent) settle on the ground, 0.25 kg (1 percent) persist in the form of droplets with a diameter greater than 10 mm, and 4 kg (12 percent) remain in the form of unburned vapor. Maximum pressure at ground surface at a distance of 3 m is 14 kg/cm^2 at the moment the cloud is detonated.

It is believed that the DICE-FAE computer model makes it possible not only to do without field tests but also to determine the weight ratio of fuel and bursting charge, the fuel droplet size distribution in the fuel-air cloud, the elevation and rate of fall of the ammunition at the time the bursting charge is detonated, the fuel characteristics that influence droplet formation and evaporation, the place and time of detonation of the detonators, and their parameters.

Second-generation ammunition includes BLU-95 (500 pound) and BLU-96 (2,000 pound) bombs intended to be dropped by high-speed airplanes. They are filled with propylene oxide (correspondingly 136 and 635 kg). One of the variants of the BLU-96 is being designed as the warhead of GBU-15 guided bombs. The 1,000 pound fuel-air bomb presently under development has a charge containing 500 kg of methane. It was reported in the foreign press that the excess pressure created by such a bomb in the shockwave front is 0.9 kg/cm^2 at a distance of 130 m and 0.42 kg/cm^2 at a distance of 190 m. It is noted in this case that an excess pressure of 0.8 kg/cm^2 does serious damage to surface ships, while a pressure of 0.42 kg/cm^2 is sufficient to knock optical instruments and radio communication antennas used on tanks.

One of the promising hydrocarbon fuels for second-generation ammunition is liquid heptane (C_7H_{16}). The chemical reactivity of this compound is increased by the addition of up to 20 percent propylnitrate or butylnitrate, which raises its detonation characteristics. During experiments the average velocity of the shock wave created by detonation of a heptane-air cloud with a diameter of 7 m (to which 20 percent propylnitrate had been added) attained about 1,600 m/sec. In comparison with propylene oxide, 27 percent more atmospheric oxygen is consumed in such a volume, which increases the detonation zone and, consequently, the combat effectiveness of the ammunition. It has also been noted that were the diameter of heptane droplets in the fuel-air cloud to be decreased, the detonation process would be intensified significantly.

American specialists also classify the SLU-FAE land mine clearing system as second-generation fuel-air ammunition. This system is a 30-barrel salvo-fire rocket launcher mounted on an M548 tracked transporter. It can launch 346-mm free-flight rockets carrying fuel-air charges to a range of 300-1,000 m. Each rocket weighs 87 kg, and its warhead is filled with propylene oxide (38 kg).

Combat use of first-generation ammunition in Southeast Asia revealed that this weapon breaks the international rules of armed conflict. In particular, it

was established that the shock wave created upon expolosion of fuel-air ammunition elicits injuries such as air embolisms in blood vessels (plugging of vessels by air bubbles), brain contusions, hemorrhaging as a result of rupture of parenchymatous organs (liver, spleen), pneumothorax (penetration of air into the pleural cavity and consequent exclusion of the lung from the respiratory act), pulmonary atelectasis (exclusion of certain portions of pulmonary tissue from the breathing function owing to loss of its elasticity), ejection of the eyeballs from their sockets, rupture of eardrums etc. All of this, as well as the ineffectiveness of known protective measures, were the grounds upon which the United Nations concluded that fuel-air ammunition is "an inhumane resource of warfare eliciting excessive suffering in people." As a result in its 1976 meeting in Geneva, the Extraordinary Committee for Conventional Weapons adopted a document qualifying fuel-air ammunition as a form of weapon requiring international prohibition.

As a result of a campaign conducted during this time in the United Nations to prohibit military use of fuel-air ammunition, the American administration was compelled to impose a prohibition on the sale of such weapons to other countries in February 1977, even though not long previous to this, the USA had promised to supply such weapons to Israel. At the same time, judging from reports in the Western press, Israeli "hawks" in the government adopted a decision to develop fuel-air ammunition locally.

Later on, the entire world was witness to the use of the most barbaric weapons by Zionist aggressors, with the direct support of Washington, in their attempt to achieve predatory goals in the course of a brazen invasion of the territory of sovereign Lebanon. In addition to cluster bombs and incendiary weapons, which have also been qualified by international conventions and treaties as prohibited weapons, they used aircraft-carried fuel-air ammunition which the USA supplied to Israel despite the sharp condemnation by the world community. Information carried in the foreign press indicates that the Israeli armed forces used American BLU-95 and BLU-96 fuel-air bombs on Beirut.*

The U.S. administration, which is headed by President Reagan, an ardent anti-communist, has now adopted an unconcealed course of unprecedented growth in the potential of its armed forces: It has sharply activated the efforts to create new forms of highly effective weapons, including third-generation fuel-air ammunition. This new ammunition differs fundamentally in that formation of the fuel-air cloud occurs simultaneously with its detonation--that is, only the bursting charge is required, and there is no need for initiating detonators. In the opinion of American experts this simultaneous process promises extremely high advantages, inasmuch as it significantly reduces the influence of external factors, including meteorological conditions.

Mechanisms such as a shock wave, a chemical reaction, and photochemical and thermal ignition are being considered as ways for detonating the fuel-air cloud created by third-generation fuel-air ammunition. Thus it was noted in

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* They came to be called "vacuum bombs" in the press, including the Soviet press.--*Editor.*

the Western press that a shock wave created by the explosion of 2 kg of conventional high explosive is capable of detonating fuel-air mixtures of methane and propane with air having concentration ratios of 70:30 and 60:40 percent.

In chemical initiation, which is believed to be one of the most promising methods, an oxidizer is sprayed into the principal fuel following its atomization. This oxidizer causes ignition of the gas mixture either on its own or with the participation of catalysts. The function of the catalysts is to cause a chemical reaction between the fuel and oxygen to form intermediate combustion products (free radicals) necessary for arisal of the detonation process. Experimental detonation of acetylene, propane and butane was achieved using fluorine (as the catalyst) and pure of atmospheric oxygen (as the oxidizer).

The energy yield of the detonation process caused by chemical initiation depends on successive dispersal of the fuel and oxidizer, on the quantity of energy released in the reaction with the oxidizer, and on combustion of the fuel. Two possibile ways of achieving a maximum energy yield are being studied. One of them entails selecting the precise time interval over which to delay the injection of the oxidizer, so as to insure arisal of a chemical reaction following dispersal of the fuel to a cloud of the required concentration, and release of energy within the cloud so as to create coherent pressure pulses that gradually intensify the shock wave to a level causing development of the detonation process. In the second method, which excludes the need for such a time delay, an oxidizer taking the form of highly reactive polyhalogens (ClF_3 or BrF_3) is combined with an atomizing bursting charge. This insures simultaneous atomization of the fuel and ignition. Both of these processes occur at such high speed that as the cloud forms and burns, a fast-moving front releases large quantities of energy, creating a shock wave in the end.

One of the forms of experimental fuel-air ammunition making use of the first method is a 5 kg container of powder filling (for example aluminum) or liquid hydrocarbon fuel. A 400 gm steel bottle containing the oxidizer (ClF_3 or BrF_3) inside this container is wrapped in sheet high explosive. When the highest explosive is detonated, the fuel and, after a little while, the oxidizer undergo atomization. It is felt that for detonation to proceed normally, the time delay of the latter's atomization must be 40-50 msec; in this case experiments demonstrated the possibility of adjusting the detonation rate by changing the rate of atomization of the oxidizer.

The mechanism behind the detonation process achieved with the second method is based on formation of directed jets of atomized fuel (diesel fuel or heptane) and oxidizer (ClF_3 or BrF_3) due to the star shape of the bursting charge and arisal of a cumulative effect in the recesses between the "teeth" of the charge, into which the oxidizer, stored in a stainless steel container, is placed. Liquid hydrocarbons and polyhalogens are absolutely immiscible compounds, however, being heavier, polyhalogens mix in atomized form with atomized hydrocarbons, inasmuch as instability exists at the "liquid-liquid" boundary. Both liquids are broken down into miniscule droplets as a result of the pressure exerted by explosion of the bursting charge--several hundreds of thousands of kilograms per square centimeter. In this case the jets of

fuel-oxidizer mixture sweep along air trapped between them--more than required to burn the fuel, the swift burning of which takes the form of an explosion.

It was experimentally established that when ClF_3 oxidizer is used, initiation occurs after 10-15 μsec, while when BrF_3 is used, it occurs after several hundred microseconds, such that in the latter case there is more time for the fuel-oxidizer mixture to mix with air, and consequently a larger quantity of oxygen is drawn into the detonation process. When the fuel-air ammunition is cylindrical in shape, the fuel-oxidizer jets create a ring-shaped cloud, in which the shock wave forms both in the radial and the axial direction, with the axial shock wave attaining a velocity of M = 4-5. In this case the jump in temperature and pressure at its front would significantly hasten burning, which would cause an increase in the shock wave's velocity and development of a higher order of detonation.

The photochemical ignition method is based on the principle of raising the concentration of free radicals formed as a result of decomposition (photodissociation) of the compounds in response to the action of ultraviolet rays. According to foreign publications the energy of ultraviolet pulses necessary, for example, to ignite propane-air mixtures is on the order of 4 joules, given a propane concentration of about 4 percent and a cloud pressure of 0.675 kg/cm^2. In this case the mixture is ignited by ultraviolet rays with a wavelength of 145-165 nm, while combustion is accelerated by ultraviolet rays with a wavelength of 163-200 nm.

The thermal initiation mechanism is characteristic, in particular, of ruby lasers (operating in a pulsed mode or in Q-factor reversal mode). It was experimentally established that fuel droplets in a fuel-air cloud containing propylnitrate and heptane undergo atomization without combustion, though a blast wave forms when the mixture is irradiated in Q-factor reversal mode; on the other hand when fuel droplets mixed with oxygen are irradiated by laser pulses (with a repetition period of 100 μsec), detonation occurs. Under these conditions fuel mixed with ordinary air produces simple burning only.

It is noted in the foreign press that besides the USA and Israel, France, Canada, Great Britain and Japan are also making active efforts to create fuel-air ammunition, and that in the next few years these weapons will be adopted by the armies of these countries.

11004
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AWACS APPARATUS ABOARD E-2C HAWKEYE DESCRIBED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 53-56

[Article by Engr-Maj L. Semenov: "Electronic Equipment of the Hawkeye Airplane"]

[Text] The military leadership of a number of foreign countries is now devoting greater attention to equipping its armed forces with airborne warning and control systems (AWACS). In the opinion of foreign specialists such systems possess significant advantages over land-based radar of similar purpose; in particular, the range at which they detect low-flying targets is significantly greater, their viability is high, and they permit flexible use in the course of combat operations.

The E-2C Hawkeye, developed by the American Grumman Corporation, is one such AWACS airplane (its basic characteristics are presented below). Its first flight occurred in January 1971, and in 1973 it was adopted by U.S. naval aviation. The Western press notes that the naval command ordered 95 E-2C aircraft, of which more than 60 have already been delivered (see color insert [not reproduced]). Besides in the USA, such aircraft can be found in Japan (the first four out of an order of eight have been received, Figure 1 [figures not reproduced]) and Israel (four are operational in the air force). Other countries are also showing interest in the airplane, namely France, Egypt, Australia and Singapore.

Judging from reports in the foreign press, the E-2C Hawkeye is intended for detecting, identifying and tracking airborne targets, guiding fighters to them, detecting water surface (ground) targets and controlling air traffic. In order that this entire complex of missions could be fulfilled, the airplane's onboard electronic equipment includes warning radar, identification apparatus and an electronic intelligence (ELINT) station--the principal information acquisition resources, and communication, data processing, display and control subsystems.

Weight, kg:	
Maximum take-off	23,500
Empty airplane	17,200
Fuel in internal tanks	5,620
Maximum speed at an altitude of 6,000 m	600

Service ceiling, m	9,400
Ferry range, km	2,580
Patrolling time, 320 km from base, hr	3-4
Flying time with maximum fuel reserve, hr	6
Take-off run (to a height of 15 m), m	790
Minimum landing run, m	380
Power plant:	
Number × type of engine	2 × turboprop
Shaft horsepower (of each shaft)	4,910
Airplane dimensions, m:	
Length	17.54
Height	5.58
Wing span	24.56
Wing area, m^2	65.03
Crew, persons	5

An AN/APS-120 radar set operating in the decimeter wave band was installed in the first 32 series-produced Hawkeye aircraft adopted by U.S. naval aviation. It has been reported that at a flying altitude of about 9,000 m, the E-2C's radar set can detect enemy fighters from a range of about 370 km, and that it can measure the bearing, range and speed of the target. Because the radar set is equipped for coherent processing and pulse modulation of emitted signals, it is capable of distinguishing low-flying targets on the background of an underlying surface, and it has sufficiently high resolution coupled with high detection range.

American specialists feel that the main shortcoming of the radar set is its limited possibilities for detecting and tracking low-flying targets on land clutter. Therefore a new radar set, the AN/APS-125, created by General Electric on the basis of the AN/APS-120, was added to the onboard equipment of the Hawkeye beginning with the 33d series-produced model. In the future, this radar set will be installed aboard the first 32 airplanes. It is felt that the AN/APS-125 radar set exhibits practically the same effectiveness in detecting and automatically tracking targets both above the sea and above land. This was achieved by introducing digital methods of processing received signals, by increasing the memory of the central computer and by using adaptive methods for maintaining the optimum level of false signals.

In addition it has been noted that the radar set exhibits high resistance to deliberate and natural interference owing to the use of different forms of selection of received signals (including selection of moving targets) and automatic compensation of the intensity of incoming signals in the lateral lobes of the antenna beam pattern. Depending on the tactical situation, the radar set may operate in passive mode as well, performing the functions of an ELINT station in this case.

The target speed measuring channel contains 16 parallel Doppler filters, each of which is intended for a finite interval of change in velocity--up to 23 km/hr. The band width of the Doppler system does not embrace the entire possible range, which is why signals from targets flying at multiples of certain velocities (for example 220, 440, 880 km/hr) enter into the same filter. To

preclude ambiguity in velocity determination, information indicating the range to the target, which is obtained in several sweeps of the radar antenna, is employed.

The AN/APA-171 antenna system, which is located above the fuselage within a saucer-shape radome with a diameter of 7.32 m, revolves at 6 rpm. It consists of two antennas--one for the radar set and one for the identification apparatus. The radar antenna is an array of 10 "wave channel" emitters.

The IFF [identification, friend or foe] apparatus, which is designed as an active radar set, includes a PT-988/A interrogator, a PT-859 transponder and an OL-76/AP processor. The country of origin of detected targets is established by irradiating them with coded signals from the transponder, which remain in force over a specific period of time, and subsequent processing of the reflected signals.

The AN/ALR-59 electronic intelligence station (the range of its operating frequencies is 0.5-18 GHz) is intended to reveal the parameters of received signals and the type of emitting electronic resources, and to determine their bearings. Its composition includes antennas located in the ends of the fins and in the tail portion of the fuselage, superheterodyne receivers and a processor. The receiver of the ELINT station intercepts radio emissions in a wider range of frequencies. Analysis of received signals is performed by narrowing the segment being scanned to magnitudes permitting accurate determination of the frequency and assessment of the nature of incoming signals. The bearing of irradiated targets is determined by a phase interferometer working in conjunction with a device that compares incoming signals with respect to amplitude. Information obtained on observed targets is processed by the station's processor and fed to the airplane's central computer for comparison with data from other sources.

The communication subsystem is intended for two-way information exchange with airplanes, ships and ground command posts. It is based on two data transmission lines--Link-4 and Link-11, which operate by way of the onboard air-to-ground radio sets. The first line transmits signals from the E-2C Hawkeye that select the fighter to make the attack and control the progress of its attack. In the absence of such apparatus aboard fighters, the latter are guided by voice using air-to-ground UHF radio sets. The Link-11 line is used for radio exchange between the Hawkeye and other AWACS aircraft, ships and ground command posts. Foreign specialists feel that the principal shortcomings of this communication subsystem are the inadequate covertness of its operation, low resistance to interference and a limited number of communication channels. This is why there are plans for installing the JTIDS--the joint tactical information distribution system, which should raise interference resistance in the course of automated data exchange between correspondents while simultaneously increasing the number of channels.

The data processing subsystem processes and compares target information fed in by the onboard radar set (during operation in both active and passive mode), by the identification apparatus, by the ELINT station and by external sources--ships, ground command posts, other AWACS airplanes. Moreover data indicating

the location of the Hawkeye itself are fed into the onboard computer complex as well.

The subsystem is organized in accordance with what is referred to as the hierarchical principle. Information is processed at the top level by an OL-77/ASQ digital computer consisting of two processors (each with a memory volume of 64,000 words), while information at the bottom level is processed by three processors--those of the radar set, the identification apparatus and the ELINT station. In the opinion of American experts this organization reduces the load on the central computer and raises the overall speed of the subsystem when analyzing incoming information.

Data on the country of origin of targets, their types, the coordinates, the threat they pose and their speeds, as well as on the coordinates of friendly airplanes, their armament and remaining fuel, obtained as a result of joint processing and periodically updated in the computer memory, are transmitted to multifunctional operator consoles; some of these data are also transmitted by communication lines to external users. It has been noted in the foreign press that this subsystem is intended for automatic lock-on and simultaneous tracking of 250-300 targets, and for guiding about 30 fighters to these targets.

The display and control subsystem supports display of incoming information and control of the interception of airborne targets and of strikes against sea surface (ground) targets. Information is transmitted to three multifunctional control consoles, each with two displays--a tactical situation display with a diameter of 300 mm, and a digital data display 127 mm square (Figure 2). The former, which operates in circular scanning mode, permits display of the range, bearing, and trajectory of detected targets by means of various arbitrary symbols representing enemy airplanes, as well as the fighters performing interception, the targets to which they are guided, the zone of the E-2C's standing patrol and various other information (Figure 3).

The square display refects, in alphanumeric form, information on the motion parameters of discovered targets, on apparatus failures and so on. Foreign experts note that use of different symbols in the display apparatus and representation of incoming data in alphanumeric form significantly simplify analysis of the tactical situation by the operational group (three persons) and significantly raise the group's possibilities for controlling the combat activities of aviation.

Such control is organized on the basis of information produced by the Hawkeye's data processing subsystem. In this case each of the members of the operational group monitors the tactical situation, and using the appropriate controls he can change the volume of displayed information, eliminating surplus data or introducing additional data. Having estimated the situation, using a light stylus the operator selects the targets intended for interception (Figure 4), and the onboard computer complex begins to generate data (course, altitude, speed, range to target) that are then transmitted to the fighters being guided in. After the latter perform their interception, the optimum routes for returning to their base are transmitted to them.

Judging from reports in the foreign press, the E-2C airplane has the capability for verifying the serviceability of onboard electronic equipment using a built-in monitoring system that operates both during preparations for take-off and during flight. This system is based on the airplane computer, and it can check out about 85 percent of the apparatus. If a malfunction occurs, the search for it is initiated by a command from the operator, who responds to a signal lamp on the control console indicating arisal of a malfunction; the computer assists in "interrogation" of the apparatus, evaluation of its state down to the level of the unit requiring replacement, and in preparing recommendations on possible back-ups. The monitoring results are displayed on the operator's square display. Special monitoring and testing apparatus is used to check the serviceability of onboard equipment in greater detail when the aircraft is down (aboard the carrier or at its airfield).

11604
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AMERICAN BATTLESHIPS RETURNING TO SERVICE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 57-62

[Article by Capt 1st Rank V. Chertanov: "Battleships in the Pentagon's Plans"]

[Text] The heavy losses suffered by the British navy in the course of combat operations in the South Atlantic during the Anglo-Argentine armed conflict over the Falkland (Malvinas) Islands, and especially the sinking of the modern guided missile destroyer "Sheffield" by an Exocet antiship missile, rekindled the sharp debate in Western military circles concerning the vulnerability of surface ships to high-precision missile weapons. Even more sensational to the specialists was the decision of the U.S. administration to demothball World War II vintage battleships and prepare them for action in the navy.

According to the foreign press these most powerful artillery ships can now be found only in the American reserve fleet, in which they are represented by four battleships of the "Iowa" class built in 1943-1944 (BB61 "Iowa," BB62 "New Jersey," BB63 "Missouri" and BB64 "Wisconsin"). Their total displacement is 58,000 tons, their length is 270.4 m, their beam is 33 m, their draft is 11.6 m, the main engines generate 212,000 horsepower, their maximum speed is 33 knots, and their cruising range is 5,000 nautical miles at 30 knots and 15,000 nautical miles at 17 knots. They are armed with three 406-mm three-gun, 10 127-mm dual purpose two-gun and five 40-mm quad (on the "Missouri") artillery mounts. Foreign specialists note that battleships conceded their leading role to aircraft carriers as early as in World War II, and that they quickly left the scene in the postwar era. It has been reported that the last two battleships in the world--the "Wisconsin" and the "Iowa"--were decommissioned from the USA's active navy in 1958. Of course, 10 years later (in 1968) the battleship "New Jersey" was temporarily recommissioned, and it took part in the aggressive war in Indochina, during which it fired 5,688 rounds of ammunition from its main guns at peaceful Vietnamese population centers. Nonetheless, the dreadnought was unable to have any influence on the outcome of the American adventure, and in 1969 it was once again laid up. Periodically militaristic circles of the United States brought up the idea of resurrecting these ships, but they did not enjoy any serious support. The age of the battleship, it seemed, was finished forever.

But in 1981 the U.S. Congress adopted another in a succession of programs of arms escalation forwarded by the Reagan administration. In addition to financing

construction of "Ohio" class atomic missile submarines, the B-1 strategic bomber and MX intercontinental ballistic missiles, it sanctioned the allocation of resources for demothballing and modernizing the "New Jersey," and in general it gave approval to a program for preparing all four battleships for their return into the active navy (Table 1).

The program for demothballing and modernizing the battleships will include, in addition to hull work: installing eight four-container protected launchers for Tomahawk cruise missiles, four four-container launchers for Harpoon antiship missiles and 20-mm Vulcan-Phalanx artillery mounts; equipping landing pads and a hangar for three antisubmarine helicopters; installing new communication, fire control and electronic warfare systems and radar stations. All of the three main three-gun turrets and six of the 10 127-mm two-gun artillery mounts will remain on the ships (the locations of the weapons are shown in Figure 1).

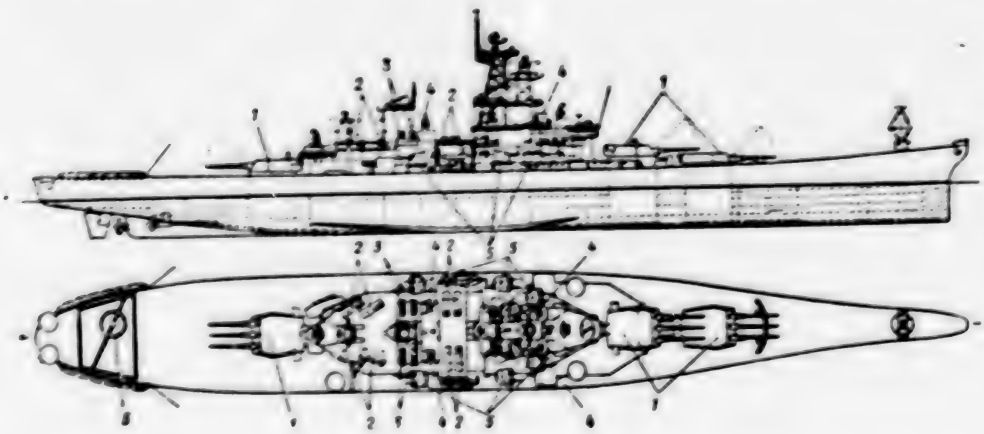

Figure 1. Location of Weapons on the Battleship BB62 "New Jersey": *1*--406-mm three-gun artillery mount; *2*--four-container protected launcher for Tomahawk cruise missiles; *3*--four-container rocket launcher for Harpoon antiship missiles; *4*--20-mm Vulcan-Phalanx artillery mounts; *5*--127-mm two-gun artillery mounts; *6*--helicopter landing pad

All of the planned work of demothballing and modernizing the battleship "New Jersey" was completed in late 1982 at the naval shipyard in Long Beach (California). The ship underwent post-repair trials (Figure 2 [not reproduced]), and on 28 December it was transferred to the navy during an official ceremony attended by the president. The trials of its weapon systems are continuing in 1983. In particular there are plans for launching some Tomahawk cruise missiles (eight of the missiles should reach the battleship in March or April of this year). In June the "New Jersey" left port on a trial run for the West Pacific for its final trials in the Seventh Fleet.

Table 1. Program for Demothballing Battleships of the U.S. Navy

Ship, Year Commissioned	Year Decommissioned	Ship's Present Status	Demothballing Time, in Months	Planned Outlays on Demothballing, $ Million	Date of Commissioning Following Demothballing
BB62 "New Jersey," 1943 and 1968	1955 and 1969	Undergoing trials following demothballing within the composition of Seventh Fleet	18	326	December 1982
BB61 "Iowa," 1943	1958	Undergoing demothballing at the shipyard of Litton Industries, Ingolls Shipbuilding Division (Pascagoula, Mississippi)	27	411	December 1984
BB63 "Missouri," 1944	1955	Mothballed (Bremerton, Washington)	24	470	January 1986
BB64 "Wisconsin," 1944	1958	Mothballed (Philadelphia, Pennsylvania)	24	458	January 1987

Demothballing of the battleship "Iowa" was started in April 1982. Following preliminary preparation of the hull and temporary disassembly of all of the 127-mm dual purpose artillery mounts, it was towed to New Orleans (Louisiana), where in mid-September it was placed in drydock for hull work. Since January of this year the "Iowa" has been undergoing modernization at the shipyard in Pascagoula. This work is to be completed before the end of 1984. Demothballing and similar modernization of the battleships "Missouri" and "Wisconsin" have been foreseen by the 1984-1986 budget.

What are the reasons for this turn in the fate of battleships? The following factors are listed in the foreign press as having had influence on the Pentagon's decision to recommission these ships.

First of all there is the unrestrainable yearning of the USA's ruling summit to achieve "total superiority" over the Soviet Navy. As U.S. Naval Secretary J. Lehman announced, demothballing of the battleships "is the most effective means of increasing the offensive striking power of the American fleet.... An equality of forces at sea is unacceptable to us." "By demothballing a battleship we get a powerful ship for the price of a frigate...," "this is cheaper and faster than building a submarine," representatives of the navy staff second his sentiments, while concurrently getting additional allocations for new submarines, frigates, cruisers and carriers in practically unlimited dimensions, which would insure attainment of a naval ship strength of 600 units as early as in the present decade.

Second, inasmuch as armed conflicts arise from time to time among the Third World countries, in the opinion of the American command such dreadnoughts, with their powerful artillery and missile armament, fit the role of "peacekeeper" best of all. Moreover it is believed that their presence would reduce the intensity with which aircraft carriers are used in the Caribbean Sea, the Indian Ocean and the eastern Mediterranean.

Third, battleships armed with cruise missiles will significantly supplement American carrier forces and permit the naval command to deploy almost 40 percent more ships of the principal classes within the composition of forward groupings at any moment in time. In addition the opinion exists that they will nonetheless be unable to replace aircraft carriers. Judging from a statement by Admiral T. Hayward, former chief of naval operations, there can be no comparison between the offensive striking power of carrier groups and battleships, though the latter, as is equally true of other guided missile ships, will make a significant contribution to increasing the navy's combat capabilities; moreover the outlays on their demothballing in the next 4-5 years are estimated at just $ 1.5 billion, which is at least half the cost of a modern atomic aircraft carrier, construction of which takes 6 or 7 years.

While emphasizing that ships serve a useful life of 30 years in regular navies, NATO specialists nonetheless feel that battleships of the "Iowa" class, which have actually been listed in the navy's effective combat strength for not more than 15 years, could remain in service for about another 20 years after demothballing.

Although demothballing of the battleships is still continuing, the proponents of the arms race have already raised the issue of performing second-priority work on them in 4 or 5 years (during the time of planned overhaul). The following variants of their further modernization are being considered in this case.

The first entails disassembling all or some of the remaining 127-mm dual purpose artillery mounts, replacing the launch tubes for antiship and cruise missiles by a single vertical-launch system for Tomahawk and Harpoon missiles (containing 100 units per magazine) and replacing the after main gun turret by a hangar and flight deck for 12 vertical or short take-off and landing airplanes, or simply reinforcing the after part of the deck to permit its use by 11 or 12 antisubmarine helicopters and their maintenance. According to data in the Western press, the outlays will be $ 0.5-1.25 billion.

The second variant foresees installing, in addition to the former, an Aegis antiaircraft missile complex with the purpose of providing dependable air defense. According to calculations made by foreign specialists the cost of the work will exceed $1.3 billion.

The proponents of the third variant, who favor a more-economical solution, suggest rejecting installation of a flight deck and a single vertical missile launcher, limiting the offensive capabilities of battleships to the existing Tomahawk and Harpoon missile launchers and keeping all of the main gun turrets intact. At the same time, in their opinion, improvements should be made in the unique 406-mm guns as permitted by the achievements of modern technology, which would raise their accuracy and increase their range of fire to 90 km. The defensive capabilities are to be improved by installing antiaircraft missiles--right in the initial stage of modernization for the battleships "Iowa," "Missouri" and "Wisconsin," and in the subsequent stage for the "New Jersey."

In any case, in the estimation of Western military specialists, equipping battleships with the Tomahawk cruise missile, the Harpoon antiship missile and antiaircraft missiles would serve as the grounds for reclassifying these ships as guided missile battleships (BBG).

The issue of using guided missile battleships in combat operations at sea is being analyzed in detail by the foreign press. It has been reported that their rebirth introduced a new significant element into strategic planning in the USA. It was noted in the American press that cruise missiles that can be launched from battleships at targets deep within enemy territory possess high accuracy, they are resistant to air defense resources, depending on the modification they have a range of 2,500 or 500 km, and they can carry a nuclear or a conventional warhead.* Admiral S. Foley, commander of the U.S. Pacific Fleet, stated: "Long-range cruise missiles will be the main weapons of battleships."

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* For greater detail on sea-based cruise missiles, see: ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 2, 1982, pp 79-82.--*Editor.*

These ships, NATO specialists go on to emphasize, are to play the role of carriers of additional forward-based nuclear resources called upon to significantly increase the potential of a first strike in a nuclear war.

It is noted at the same time that in a nonnuclear war, and in local conflicts of varying scale, the role of battleships is highly significant. They may be used both within the composition of a carrier group and independently, as the nucleus of a special task force or within the composition of a detachment of fire support ships capable of fulfilling all of the missions of war at sea, including achieving domination of certain regions of sea theaters of military operations, protecting lines of communications, supporting assault landing operations, or simply maintaining a military presence, offering a demonstration of force in regions of "vital interest" to the USA.

As far as demonstration of force is concerned, in this case the American naval command feels that the battleship does have a number of advantages, even in comparison with an aircraft carrier, which is believed to be the most effective ship of the navy. Thus dependable armor and high combat stability provide it the possibility for approaching a coastline within visible range despite countermeasures by coastal defenses, and its powerful armament and impressive size will have a great psychological influence on the enemy. An aircraft carrier, meanwhile, which carries sizable reserves of aviation fuel and possesses light armament, and which is compelled to constantly maneuver with the purpose of supporting the flying of deck-landing aviation, usually does not come closer than 200 nautical miles from shore.

These advantages permit the use of battleships right within narrows and straits, to which they can be quickly transferred from their combat patrol regions, owing to their high speed, in order to prevent operational deployment of the enemy's surface fleet in the open ocean. Here, these ships will operate within task forces (containing one or two battleships and four to eight escort ships) under the cover of shipborne aviation.

Battleships are also capable of providing cover, in coordination with aircraft carriers, to large assault landing formations or convoys sailing to a crisis area, and supporting the landing of marines and "rapid deployment forces" on a shore.

The experience of World War II and calculations made by Western military specialists prove the battleship to be highly resistant to the effects of conventional artillery shells, bombs, torpedoes and even antiship missiles with rather powerful warheads, ones which can effectively hit a lighter modern surface ship, destroy its superstructure and render it uncontrollable. At the same time it has been noted that there are no unsinkable ships: The battleship is especially vulnerable to missiles carrying hollow-charge warheads that are capable of penetrating through armor and, of course, to nuclear ammunition (even of low yield), which is capable of putting a battleship out of commission.

By the end of the current decade (some time after 1986), when improvement of all modifications of Tomahawk cruise missiles will be completed and a

sufficiently large number of ships equipped with Aegis antiaircraft missiles (guided missile cruisers of the of the "Ticonderoga" class and a new class of guided missile destroyers--DDG51) become operational, battleships will be able to operate within the composition of special task forces of surface ships or surface strike groups (SSGs). These groups must be capable of independent combat operations in different regions of the World Ocean. In addition to a battleship, the SSG will include, as escort ships, a cruiser and three DDG51 guided missile destroyers possessing effective antiaircraft resources. Moreover, by this time the armament of the battleship itself will probably include modern antiaircraft resources or vertical or short take-off and landing airplanes. In terms of its striking power, foreign experts believe that SSG will be inferior only to the carrier group.

According to the foreign press, battleships are to play an especially important role in organizing fire support to marine assault landing operations. In comparison with the standard 127-mm artillery mounts of U.S. warships, a battleship's main guns can significantly increase the depth of influence upon coastal anti-assault landing targets (double the range and four times the destructive capability).

Table 2. Organization of Missile, Artillery and Air Support to Assault Landing Forces

Sequence of Assaults	Range of Weapons, km	Actions of Fire and Air Support Forces
First	up to 1,200	Raid by shipborne aviation upon antiaircraft and anti-assault landing objectives not targeted for Tomahawk cruise missiles
Second	up to 500	Strikes by Tomahawk cruise missiles against principal anti-assault landing objectives
Third	up to 40	Assault of antiaircraft by ship artillery with the purpose of supporting penetration of defenses in the assault landing area
Fourth	up to 1,200	Bombing and strafing strikes against enemy objectives through corridors prepared by ship artillery
Fifth	12 - 40	Destruction of principal targets by artillery fire upon request by assault landing forces (in coordination with aviation)

It is noted in the Western press that the USA's naval depots still contain over 20,000 armor-piercing and high-explosive fragmentation shells with a caliber of 406 mm (each weighs 860-1,225 kg). In an hour of fire, nine ship guns can fire over 1,000 shells--that is, shower a target with 1,000 tons of lethal cargo. It is also emphasized that a battleship's armor affords protection against the fire of practically all existing coastal artillery guns firing conventional ammunition. At the same time it is indicated that countermeasures must be accounted for today not only from coastal artillery but also from the enemy's antiship missiles and aviation. This is why strictly coordinating the fire of the main guns of battleships with missiles (Harpoon, Tomahawk) and attack aircraft, so that the latter could first destroy coastal antiaircraft and anti-assault landing resources, is recommended. A possible variant of combined missile-artillery and air support to assault landing forces is described below, as imagined by American specialists.

First, aviation and cruise missiles would neutralize the principal antiaircraft and anti-assault landing objectives (primarily missile and artillery batteries), thus making it possible for the battleship to come within range of its main guns. Then the battleship would annihilate the remaining antiaircraft installations, so as to reduce aviation losses in subsequent sorties, after which it would strike objectives and targets (as requested by the commander of the assault landing forces) and keep the landing area isolated (Table 2).

In the opinion of foreign military specialists the striking power of battleships (when combined with cruise missiles and artillery) and the operational flexibility of their use significantly raise the combat capabilities, including assault landing capabilities, of the American navy, which has been and continues to be a tool of aggression and piracy.

11004
CSO: 1801/066

U.S. NAVAL RESERVE PREPARED FOR WARTIME SUPPORT

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83 pp 62-66

[Article by Capt 1st Rank N. Mulin: "The U.S. Naval Reserve"]

[Text] The plans for increasing the power of the U.S. Navy devote considerable attention to developing the reserves, which include personnel, ships, airplanes and other materiel, and which are viewed as the foundation for mobilizational deployment and swift reinforcement of the regular navy in time of war.

Numerous articles revealing the role and significance of the naval reserves are being published in the foreign press. They note that presence of ready reserves was a significant aid in increasing the strength of the regular navy in the United States from 285,000 to 3.5 million persons and the quantity of ships and boats of all classes from 1,100 to 50,760 during World War II. During the aggressive war in Korea (1950-1953) over 250,000 reservists were called up by the navy, and more than 150 ships of the reserve fleet were transferred to operational units. During the period of aggression against Vietnam the USA once again looked to its reserves as a means of increasing naval power. The following ships, boats and auxiliary vessels were added to the navy's effective combat strength: 1 battleship, 2 cruisers, up to 20 destroyers and frigates, over 30 assault landing ships, more than 100 patrol and assault landing boats and about 25 auxiliary vessels. One hundred seventy-six merchant vessels were additionally taken out of the reserve national defense fleet.

It is emphasized in the American press that the peacetime missions of the reserves include training and maintaining militarily-trained contingents as well as weapons and combat equipment ready for use. It has been reported that reserve personnel and formations are taking part in over 15 combat and auxiliary missions, and that in the opinion of the command of the U.S. Navy, they are making a noticeable contribution to these missions. They are being used to support airlifts within the continental portion of the country, to conduct minesweeping, diving and freight handling operations, to provide services in military hospitals and so on.

The naval reserve is manned by volunteers up to 60 years old who had served in the military or had undergone mandatory 6-month training in the regular navy, and it has a strength of about 450,000 persons.

Reserve personnel are subdivided into three priority classes depending on their combat readiness and mobilization priority.

Reservists in the organized (paid) and unorganized (individual) reserve make up the primary reserve. Persons in the organized reserves are assigned to specific reserve formations, each year they undergo mandatory regular combat training, and they receive pay, while persons in the unorganized reserves do not. Primary reservists are the first to be called into active military service upon declaration of war by Congress or when the president places the country in a state of emergency, and their purpose is to raise the manning of ships, units and subunits of the regular navy and the organized reserve to wartime levels.

The secondary reserves include persons who had served not less than 6 years in the regular navy and in the primary reserves. They do not undergo mandatory combat training, and they are maintained as individual reservists. They are called up for active military service only in the event of declaration of war or announcement of a state of emergency.

Tertiary reserves are composed of reservists who had served in the regular navy and in the primary and secondary reserves for not less than 20 years. They may be called up for active service only in the event of total mobilization in a time of war, or upon announcement of an emergency situation and when primary and secondary reserves have been exhausted.

According to materials in the foreign press the American naval reserves consist of a fleet, an aviation fleet and marines. The national defense reserve fleet occupies a special place. It contains vessels of the Department of Commerce as well as transport and auxiliary vessels transferred to the Commerce Department's merchant marine from the navy as an economy measure. In addition the Coast Guard forces, which have their own reserve, are also transferred to the navy in the event of war or in an emergency situation.

The reserve fleet includes ships (in an emergency reserve, and mothballed) and personnel. According to data in the American press the emergency reserves contain three destroyers ("Edson," "William C. Lawe," "Harold J. Ellison"), four frigates ("Gray," "Lang," "Miller," "Valdez"), 22 minesweepers, two tank-landing ships, four assault-landing cargo ships, a rescue vessel and five seagoing tugs, while the mothballed reserves are represented by five atomic submarines ("Halibut," "Triton," "Nautilus," "Theodore Roosevelt," "Abraham Lincoln"), one diesel submarine ("Wahoo"), five aircraft carriers ("Hornet," "Bennington," "Shangri-la," "Bon Homme Richard," "Oriskany"), three battleships ("Missouri," "Wisconsin" and "Iowa"*), three guided missile cruisers ("Albany," "Chicago," "Oklahoma City," Figure 1 [figures not reproduced]), two cruisers ("Des Moines," "Salem"), four gunboats, a floating workshop, two floating submarine bases and 10 vessels of the Military Sea Transportation Service.

* Undergoing demothballing and modernization.

Ships of the emergency reserves, which are intended for the training of primary reservists, are grouped into ship reserve squadrons, and they are included within the effective combat strength of the Atlantic and Pacific fleets. Their crews consist of both regular navy personnel and reservists. These ships are in constant readiness, necessary for their swift transfer into the composition of the regular fleet.

In the opinion of Western military specialists destroyers and minesweepers of the emergency reserve are already obsolete (they were built in the 1940s and 1950s respectively), and they fail to satisfy the requirements of training reservists to be included in the crews of modern ships. In this connection there are plans for updating the emergency reserve ship fleet prior to 1988 by transferring "Knox" class frigates builts in the 1970s (Figure 2) and some "Oliver H. Perry" guided missile frigates to it.

The purpose of ships and auxiliary vessels presently in mothballs is to reinforce the navy upon mobilization for war, and in peacetime if necessary. These ships are anchored at the naval bases in Philadelphia (Pennsylvania) and Norfolk (Virginia) on the country's Atlantic coast and at Bremerton (Washington) on the Pacific coast.

Reserve ships are divided into the following categories depending on their preparedness and their priority of transfer into the regular navy.

Category A--warships of the main classes; placed in active service on first priority (within 30 days). Most of them are in the emergency reserve.

Category B--warships that are to be demothballed in subsequent stages of mobilization, within 30-60 days. Some may be placed into service simultaneously with ships of category A.

Category C--ships in long-term storage. These ships are to be placed into service in the last stages of mobilizational deployment, and demothballing would require over 2 months.

Category D--obsolete ships intended to be transferred (sold) to other countries or scrapped.

Category X--ships excluded from the composition of the fleet.

When ships undergo mothballing, special attention is turned to preserving machinery, mechanisms, armament, fittings, compartments and the ship's hull, and primarily to protecting these items from corrosion. Lubricant is carefully applied to all items requiring it. Some mechanisms are removed and others are partially disassembled to permit access to them for periodic inspection. Internal compartments are hermetically sealed. Superstructures and hulls are protected from corrosion by special anticorrosion coatings and paints. To prevent corrosion of the submerged portion of ships and vessels, the latter are provided cathode protection and drydocked.

An outfit of spare parts is stored aboard every mothballed ship, and the necessary equipment, materials, documents, charts and various manuals are stored at depots.

Ships to be placed into service on first priority are subject to periodic repair, during which obsolete equipment is replaced by new equipment.

In the opinion of American military specialists, mothballed reserve ships and vessels are being maintained in satisfactory condition insuring their swift demothballing and transfer to the regular navy.

The naval air reserve includes formations and units of the carrier, land-based patrol and auxiliary air reserve, which contains about 400 airplanes and helicopters.

Carrier aviation includes six attack aircraft (A-7B Corsair II), four fighter (F-4 Phantom II), two air reconnaissance (RF-8 Crusader), two AWACS (E-2B Hawkeye), two electronic countermeasures (EA-6A Prowler) and four antisubmarine (SH-3 Sea King helicopters) reserve squadrons organized into two wings. Patrol aviation is represented by two reserve air wings (13 squadrons) of Orion P-3A aircraft, while auxiliary aviation is represented by a reserve fleet support air wing containing 10 squadrons--eight transport (C-118B, C-131H and C-9B aircraft) and two fleet combat training support (TA-4 Skyhawk).

The mission of the naval air reserve is to keep the materiel, flight crews and technicians at the required level of readiness for action within the regular forces in the event of their partial or complete mobilization.

Reserve pilots must satisfy the same requirements as regular pilots in terms of health and flight, operational, engineering and technical training. This is achieved by means of the appropriate standards for the combat training of units and formations in the organized reserve. They foresee monthly 2-day training cycles and annual 2-week courses of instruction and exercises within the regular naval air forces. Moreover reserve patrol aircraft squadrons are included in the composition of forward naval groupings.

The marine reserve has the mission of supporting mobilizational deployment of marine forces and the combat training of reservists. It consists of ground and air reserve formations and units of the organized reserve as well as individual reservists. The total number of reservists is about 100,000, to include 93,000 primary, 2,000 secondary and over 5,000 tertiary reservists.

The 4th Reserve Division, reinforcing units and subunits, the 4th Rear Support Group and the 4th Air Reserve Wing make up the backbone of the organized marine reserve.

The ground forces are armed with M60 tanks, LVTP-7 amphibious armored personnel carriers, TOW antitank guided rocket launchers, 203.2-mm and 155-mm self-propelled howitzers capable of firing nuclear ammunition, 81-mm mortars, grenade launchers and infantry weapons.

The 4th Air Wing of the marine reserve contains about 250 airplanes and helicopters organized into 20 squadrons, to include six attack aircraft (A-4E Skyhawk), two fighter (F-4N Phantom II), nine assault transport (CH-53 Sea Stallion, UH-1N Iroquois and CH-46 Sea Knight helicopters), one attack helicopter (AN-1J Iroquois), one observation-spotting (OV-10A Bronco airplanes) and one transport squadron (KC-130F Hercules). In addition there is a battalion of Improved Hawk antiaircraft missiles.

Reservists of the organized reserve undergo combat training in formations and units. Such training includes 48 lessons lasting up to 4 hours as well as annual 2-week courses of instruction. In the estimation of the naval command, the combat readiness of formations and units of the organized marine reserve generally satisfies the requirements. Thus inspections of the preparedness of ground subunits in 1980 revealed that 70 percent of them were fully combat ready. In addition, over 10 different exercises were held in 1980-1981, in which 99 percent of the reserve officers and 87 percent of the enlisted personnel participated.

The national defense reserve fleet contains over 300 vessels including more than 80 transport and auxiliary vessels transferred by the naval forces to the Commerce Department's merchant marine for maintenance. These include a troop landing ship, 10 tank landing ships, seven transporters, six tankers, nine large floating drydocks, 14 troop transporters and 12 seagoing tugs. These vessels are stored as groups in the following places: James River (Virginia), Beaumont (Texas) and Suisun Bay (California). They fall into three readiness categories depending on the priority of transfer into the regular navy.

Category A contains about 30 dry-cargo vessels that require 5-10 days to be readied for service.

Category B includes vessels that may be transferred to the navy after 20-25 days.

Category C contains vessels that require up to 2 months to be readied for service in the navy.

The command of the U.S. Navy feels that most vessels in the national defense reserve fleet are obsolete. Therefore in the event that mobilization is declared, the naval forces are also to be reinforced with new vessels from the merchant marine.

The Coast Guard is a special military service (containing about 34,000 persons). In peacetime it is under the administration of the Department of Transportation, and in the event of war or an emergency situation, it is transferred to the navy. According to reports in the foreign press it includes 41 escort vessels, about 80 patrol boats, more than 130 auxiliary vessels and over 130 airplanes and helicopters.

The Coast Guard Reserve (about 25,000 persons, to include 12,000 in the primary organized reserve) possesses one escort vessel. The reservists are assigned to about 160 subunits that perform harbor security, environmental protection, search and rescue missions.

Long-range programs for development of the naval reserve components foresee implementation of a number of measures to stabilize and increase their manpower, to raise the combat capabilities and mobilizational readiness of the formations, units and ships, to update the ship and aircraft fleet, to improve and expand the training base and to provide modern weapons and combat equipment. From the viewpoint of the command of the U.S. Navy, these measures should raise the combat capabilities of the navy as a whole.

11004
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U.S. NAVY PLANS FURTHER AUTOMATION

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83, pp 67-71

[Article by Capt 1st Rank (Res) A. Markov: "U.S. Navy Automated Control Systems"]

[Text] American specialists feel that the preparedness of armed forces control and communication systems must not be lower than the preparedness for action of the forces themselves. Guiding itself by this principal, the command of the U.S. Navy is trying to develop and improve naval communication and control systems.

According to material published in the foreign press, since the late 1970s the U.S. Navy has been organizing a unified operational control system, which is undergoing continual improvement and expansion. It is based on a network of command centers (CCs) established at all levels--from chief of naval operations to ship commander (Figure 1).

Every CC is responsible for a particular range of missions which generally include: acquisition, processing and display of data transmitted from different sources, preparation of the necessary recommendations for decision making, provision of dependable communication to the command and rapid delivery of orders to subordinated forces in a particular sequence.

The Naval Command Center (NCC) is located in the Pentagon. It supports the activities of the naval staff associated with managing the fleet forces. Information on the military-political situation, intelligence on the enemy, information on the state and combat readiness of the navy, the availability and demand for logistical, manpower and financial resources and the shipbuilding and repair capabilies are concentrated here. The CC monitors fulfillment of plans within the navy, analyzes incoming information, prepares summaries on all of these issues and organizes submission of the necessary information to the appropriate officials of the naval staff.

Information transmitted to the CC is collected and analyzed and the reporting and information documents concerning the status and activities of the naval forces are prepared with the help of the NSOF (Naval Status of Forces) automated control system. It was installed in the NCC in the early 1980s, replacing the previously existing information system, NAVIV (Naval Information Center). The work of this automated control system is supported by two H600

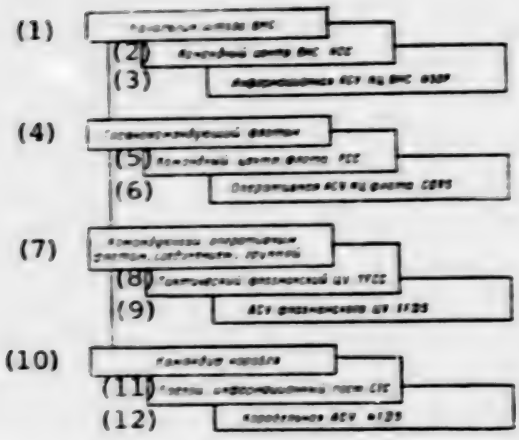

Figure 1. Basic Diagram of the Organization of Operational Control in the U.S. Navy

Key:

1. Chief of naval operations
2. NCC (Naval Command Center)
3. NCC NSOP automated information control system
4. Fleet commander in chief
5. FCC (Fleet Command Center)
6. FCC CORS automated operational control system
7. Operational fleet, task force, group commander
8. TFCC (Tactical Flag Command Center)
9. Flag command center IFDS automated control system
10. Ship commander
11. CIC (Combat Information Center)
12. Ship NTDS automated control system

three-processor computers and an H700 one-processor computer, which communicate with the computers of the main automated control systems of the Department of Defense and the Atlantic and Pacific fleets. Data from the computer are displayed on wall-mounted group and individual screens.

The fleet command centers (FCCs) are located at the headquarters of the fleet commanders in chief (Atlantic--in Norfolk, Pacific--in Honolulu) and of the U.S. naval commander in Europe (in London). The principal mission of the Fleet Command Center is to support operational-tactical control of the forces under routine conditions and in the course of combat operations.

The functions of the Fleet Command Center are supported by an automated operational control system known as the CORS (Composite Operational Reporting System), which is intended for operational reporting on the status and activities of the fleets. Its technical resources, which are based on the standard H600 computer, are installed at the command centers of the Atlantic and Pacific fleets and of the U.S. naval forces in Europe. All messages are transmitted to the computer via communication channels in a strictly formalized form in accordance with a special table containing a large assortment of standard formats.

The TFCC (Tactical Flag Command Center) is the working organ of the fleet commander and of the task force or group commander, and within the overall command system it is the basis for tactical control of forces at sea. It has been reported in the American press that technical resources intended for ship control centers have been developed and tested, and that they are now being supplied to the flagships of commanders at different levels. The organizational structure of the Tactical Flag Command Center corresponds to the structure of the shore-based Fleet Command Center; however, due to space limitations it has a significantly smaller staff and a smaller quantity of technical resources. This is why the shore-based CCs assume the main burden of data acquisition and processing in the areas of operations of task forces and transmit these data to the flagships in ready-to-use form. Data from the shore-based CC and task force ships are collected and recorded in the Tactical Flag Command Center's automated control system, the IFDS (Information Fleet Data System). The data are processed here. The system makes use of statistics previously introduced into the computer data bank and characterizing the opposing sides--their forces, weapons and the methods of their application.

The automated control system of the Tactical Flag Command Center is organized on the basis of the standard AN/UYK-20 ship computer. It has the following devices: a graphical data display permitting graphical representation of the situation on a map within a confined area or in the theater as a whole, and projection of an image of this situation on a 1.5 × 1.5 m screen; alphanumeric devices with which to retrieve and change information contained in the data bank.

The ship CIC (Combat Information Center) is intended to support the commander's control of the ship and its weapons. It continually collects and generalizes information on the current situation, and it prepares informational and calculational materials. The CICs of ships of different classes differ significantly from one another in composition. In general form, each of them consists of situation (surface, underwater, air) centers that communicate closely with antiaircraft, antisubmarine weapon control, electronic countermeasures and communication centers.

One of the principal components of the CIC is the NTDS (Navy Tactical Data System), which has been operating since 1962 and which collects, generalizes and automatically transmits information on the situation to task force ships. Moreover the system performs a wide range of tasks associated with managing the combat operations of ships of the task force, organizing antiaircraft and antisubmarine defense and controlling aviation and individual weapons.

This automated control system makes use of an AN/UYK-7 computer, while ships built in recent years are equipped with the AN/UYK-20, which is employed in the most diverse ship control systems. Depending on the quantity of information that must be handled, the automatic control system may possess from one to four computers. A simplified variant of the NTDS has been designed for ships that have undergone a number of modernizations and which do not have enough room to house the entire inventory of resources of the NTDS.

As a rule, ships of all of the principal classes possess reconnaissance resources and independent centers not contained within the composition of the CIC. Information collected and evaluated at a center is transmitted to the CIC, and if a Tactical Flag Command Center is present aboard ship, to it as well. In addition to the NTDS, an intelligence center employs its own data acquisition and processing resources. It communicates by way of its own communication resources with the automated navy intelligence control system, from which it can obtain additional information on the enemy. A special center for the control of all shipborne aviation and ship helicopter formations has been created aboard aircraft carriers, the principal weapons of which are airplanes. This center is set up as a self-contained automated control system, and its communication with airplanes and helicopters is fully automated. Close coordination of the center with the TFCC and the CIC of the aircraft carrier is foreseen. This significantly raises the capabilities of each organ.

The organizational structure of the Naval Command Center, the Fleet Command Center and the Tactical Flag Command Center is identical. The structure of the Fleet Command Center may be examined as an example (Figure 2). It includes the following combat centers: operational, general situation, intelligence, antisubmarine, communication and technical maintenance. These centers deal with problems arising within their areas of responsibility under the general guidance of the operational center, the activities of which are supported, as was indicated earlier, by the CORS.

All of the rest of the combat centers are equipped with user terminals providing access to the data arrays of the computers servicing the systems of the corresponding fleet headquarters directorates. The main functional automated control systems that support the activities of combat centers in the Fleet Command Center are: OSIS--Ocean Surveillance Information System (general situation center); NIPS--Naval Intelligence Processing System (intelligence center); ASWCCCS--Antisubmarine Warfare Command Control Center System (antisubmarine center); LDMX--Local Digital Message Exchange (communication center).

It has been reported that all of these systems are now functioning independently, that they do not communicate with one another. The American press devotes much attention to illuminating development of the unified naval automated control system, which is to be placed into operation in the second half of the 1980s, and which is to employ common hardware and software throughout. It must permit direct high-speed data exchange, use of common information arrays by every CC or staff, automatic data display on the screen of any user within the system and effective orientation of subordinated forces.

Functional automated control systems that have been deployed in the principal fleet headquarters directorates perform the following tasks: acquisition, accumulation and processing of data, its display in a format convenient to decision making, and output of required data on request or at particular times. The systems combine data from different sources and organize exchange of these data between fleet and naval headquarters and other branches of the armed forces, as well as with organs of strategic control in close to real time.

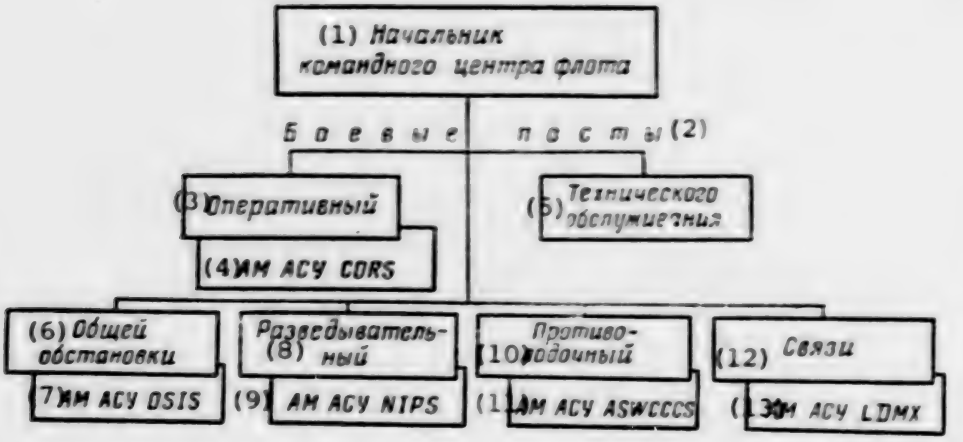

Figure 2. Basic Diagram of the Organization of a Fleet Command Center

Key:

1. Chief, Fleet Command Center
2. Combat centers
3. Operational
4. CORS user terminal
5. Technical maintenance
6. General situation
7. OSIS user terminal
8. Intelligence
9. NIPS user terminal
10. Antisubmarine
11. ASWCCCS user terminal
12. Communication
13. LDMX user terminal

Having assumed a course toward widening the presence of fleet forces, the command of the U.S. Navy had to rigidly centralize acquisition and generalization of data acquired from surveillance of the sea space. The OSIS was developed for this purpose in the late 1970s. It is based on a center located in Suitland (Maryland). It provides information to the military-political leadership and to the supreme command in the Pentagon, receiving information in the form summaries and individual reports from communicating fleet centers at the locations of the fleet commanders in chief and the commander of U.S. naval forces in Europe, as well as from special service centers (at the locations of the commanders of the Sixth and Seventh fleets), which collect and generalize information on the current situation within their areas and transmit it to the zone command. These centers receive reports, notices, summaries containing information on the locations and movements of surface, submarine, airborne and other objectives of American forces, allies, neutral countries and the enemy, of interest to the command.

The sources of information include warships and merchant vessels, airplanes, and surveillance and reconnaissance resources. Data compiled into a particular format are transmitted via communication lines as objectives are detected or in accordance with a schedule. Information transmitted to the center is fed into the computer data bank, where it is stored not more than 12 days, until the arrival of new data. Data analysis is automated, and it includes correction and sorting of reports, classification of objectives, calculation of their motion parameters, assessment of precision characteristics and so on. Information is transmitted to the command and to forces at

sea by user terminals at naval and fleet CCs and individual terminals. This information is also transmitted via communication lines in the form of summaries, notices and periodic reports. These data are constantly displayed on group and individual screens at the command centers.

Intelligence information is transmitted to command posts by the NIPS, which has been operating since 1962. According to reports in the foreign press the system is now undergoing modernization to permit conversion to modern data processing resources and displays, introduction of improved programs, provision of a capability of remote data retrieval, and updating of the data arrays. Data are fed to it in formalized form via AUTODYNE communication resources and a special indicator communication network. Information is stored in the automatic control system's data bank for up to 2 weeks, after which it is updated. The activities of the intelligence processing system support the intelligence directorate of the naval (fleet) headquarters. The terminal station of the NIPS is located in the command center's intelligence center, which feeds information to displays and publishes documented information, and which provides the required intelligence to the command and the mobile forces of the fleet.

In distinction from the system described above, the ASWCCCS is involved primarily in support of the control of forces by the fleet command and its CC. It is deployed in all of the main theaters, and it supports the activities of ocean antisubmarine surveillance systems. The information sources of this automated control system are permanent and modern antisubmarine defense centers. Its equipment collects and processes data characterizing the underwater situation, it organizes target search, tracking and distribution, and it performs centralized operational calculations.

The terminal equipment installed at the command centers is identical in all automated control systems, and it has a modular design permitting its use in the most sensible variants. The system includes: group displays (light plotting boards and signal panels) and individual displays (self-contained graphical and alphanumeric), documentation resources (printers and graph plotters), message transmitters (manual and automatic), and communication consoles supporting direct and switchboard telephone communication with practically any user in the USA and the NATO countries. There terminals can be used to request, obtain, issue and document information from the given automated control system and from interacting systems.

An internal automated communication system has been created out of the terminals installed at CCs. It has been reported that tests were conducted at the headquarters of the U.S. Pacific Fleet with the purpose of verifying its capabilities and finding ways to modernize it. Two complexes of apparatus, each of which contains 24 data displays and seven printers, were installed at the Fleet Command Center and in headquarters buildings, and interconnected with one another.

Concentration of large data arrays in naval control organs and extensive application of automated control systems necessitated significant improvement of the organization of communication and introduction of new highly productive

technical resources. These systems interconnect the CCs with each other, with the higher command and with forces at sea and in the air, down to individual ships or airplanes (Figure 3).

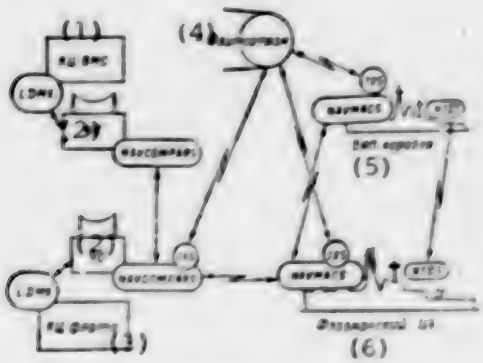

Figure 3. Automated Communication System of the U.S. Navy

Key:

1. NCC
2. Communication center
3. PCC
4. FLEETSATCOM
5. Ship CIC
6. TPCC

The need for direct communication between the computers of the command centers, headquarters and services in close to real time led to the creation of resources which would support such communication. Today all CCs have message processing centers equipped with the LDMX system, which does the work of receiving, duplicating and distributing messages. The basis of the system--a Spectra 70/45 computer--is capable of processing data addressed to not more than 10 terminals of a single organ. The resources of this system can be used to convert received messages into a form suitable for further use--that is, to recode the information, and when necessary to format the data prior to its input into the computer, reproduce it on displays and printers, duplicate it and deliver it to the addressee. The computer converts outgoing messages into a form suitable for transmission by the AUTODYNE communication system. The LDMX stores all transit correspondence, either on a short term basis (15-30 days) or for a long period of time (up to 6 months). It is emphasized that retrieval of any message is automatic; however, some of the processing operations are still manual, such that it is not yet fully automated, and it does not always operate in real time. The LDMX is the first attempt at bringing shore-based automated control systems together into a single automated system.

Message processing centers have also been created at communication centers using the NAVCOMPARS (Navy Communication Processing and Routing System). It routes messages as addressed, it selects communication channels, it determines

the priorities of reception and transmission, and it forms the program of circulated messages. The Spectra 70/45 computer, which is used by most of the communication centers, is capable of simultaneously servicing up to 85 telegraph and two high-speed communication channels. Up to 10 terminals and an optical reader can be connected to the computer for operational communication with the data bank.

In the opinion of the command of the U.S. Navy, control of mobile forces requires especially efficient communication. This requirement is partially satisfied by the NAVMACS (Naval Modular Automated Communication System), which was developed for ship communication centers and which has been in operation since 1975. The nucleus of the system is an AN/UYK-20 computer that communicates with all of the ship's communication resources--its transceivers and its terminals. NAVMACS basically scans and retrieves circulating messages addressed to the given ship, prints them out and distributes them to the addressees. Its resources also make it possible to automatically compose and transmit a message from the ship to other addressees.

NAVMACS consists of functional hardware and software modules, the number and nomenclature of which depend on the traffic handled by the ship's communication center. It is emphasized that one hardware outfit is capable of processing up to 1,200 messages a day. The computer has 16 message input and output channels, and it is relatively small in size (61 × 45 × 51 cm) and weight (51 kg). The system may include IXS (Information Exchange Subsystem) modules providing a capability for high-speed reception and transmission of data in digital form using satellite communication lines--that is, it solves the problem of raising the efficiency of communication.

Independent intercomputer exchange modules have been developed for every functional communication network, including modules providing for communication between shore-based CCs and FCCs, between shore-based headquarters and submarines, task force ships and so on. It is noted in the foreign press that the naval command intends to continue to improve the general structure of the command system, and primarily its technical resources. In its opinion, extensive introduction of automated systems for controlling forces, communication resources and weapons will help to continually support the combat readiness of the navy at the required level.

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TWO TRAINERS OF THE FRG NAVY DESCRIBED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 9, Sep 83, pp 71-72

[Article by Capt 3d Rank S. Chukalin and O. Nikolenko: "Simulator for Combat Training of FRG Naval Personnel"]

[Text] Training sessions attended by the crews of ships and submarines are occupying an increasingly greater place within the personnel combat training system of the navies of countries in the aggressive NATO bloc. These training sessions are conducted in shore-based training centers using various simulators. The explanation foreign specialists give for this is that significant successes have been attained in developing such training resources, and the possibilities for combat training at sea are limited in view of the need for economizing on resources, the absence of real targets with which to practice the use of the weapons and so on. Trainers are especially valuable to manned fighting units which do not possess their own combat resources. Judging from materials in the foreign press they are being used intensively in the combat training of naval personnel, and particularly by the command of the West German navy, in which training is organized primarily on the basis of a naval weapons school.

The AGUW general-purpose torpedo trainer is used to train the personnel of ship command centers and the weapon departments of destroyers, submarines, torpedo boats and minesweepers. It is used to develop the habits of maneuvering and using weapons in conditions simulating real naval combat. The trainer consists of seven cubicles (Figure 1) representing the command posts of different fighting units of the fleet. These cubicles are equipped with radar sets, SONAR equipment, a plotting board, ship navigation instruments, a weapon control console and communication equipment providing radio communication between ships of a task force in the course of combat. The tactical situation is simulated by a computer, and the enemy targets and their actions are programmed from a main command center. Orders to use particular weapons are transmitted from the cubicles; in this case this process is also simulated by the computer, which makes the appropriate calculations. The disposition of friendly forces and enemy objectives and the trajectories of torpedoes (or missiles) are displayed on the large screen controlled by the lesson leader from a control console. In the course of an exercise, plotters record the entire situation on a Plexiglas wall behind the screen, to be used in a subsequent critique. After each exercise the actions of the students are scored by the lesson leader

(he is usually a highly qualified instructor from the weapons school). It is noted in the foreign press that personnel from individual ships and from the headquarters of fleet task forces undergo regular training with this trainer.

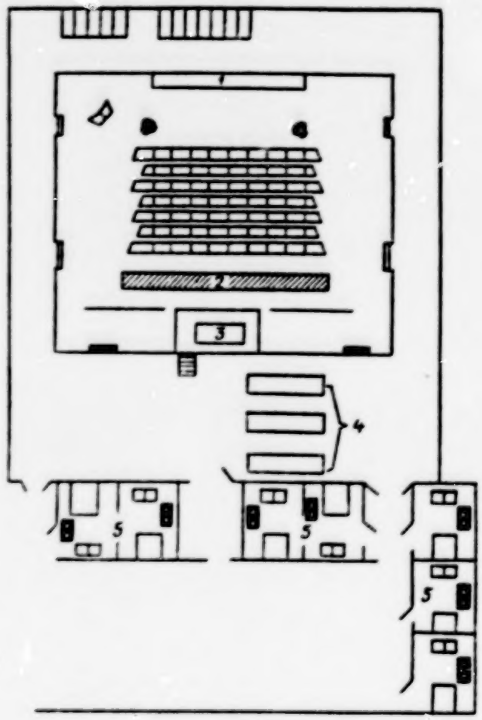

Figure 1. AGUW Trainer: *1*--large screen; *2*--control console; *3*--projector; *4*--computer blocks; *5*--cubicles

The main goal of training provided to a destroyer flotilla is to work out the problems of antisubmarine defense, including coordination with airplanes and antisubmarine helicopters. Moreover, personnel of ship command centers are taught the actions of searching for and rescuing the crews of submarines and airplanes in distress.

The AGUW trainer is used by the submarine flotilla to train the personnel of control rooms and torpedo rooms. Using passive location finding resources and without using a periscope, during these exercises the subunits must obtain target data graphically and by calculation, and launch torpedoes. The officers of the missile boat flotilla work with this trainer with the purpose of mastering the methods of combat operations. In this case the main attention is devoted to selecting the optimum combat formation of the missile boats and the moment at which to use the weapons, depending on the characteristics of the enemy and the capabilities of the resources he may employ in defense against missile boats.

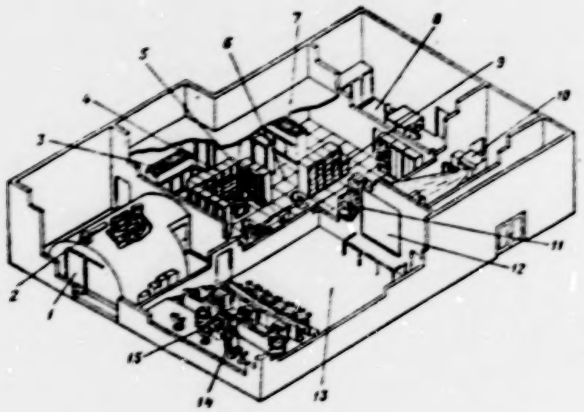

Figure 2. AWU Trainer: *1*--submarine control room; *2*--periscope equipped with situation display device; *3,7*--air conditioners; *4*--torpedo and electronic resource simulators; *5*--map input device; *6*--computer room; *8*--service personnel room; *9*--situation simulator; *10*--laser projector; *11*--situation display device; *12*--large screen; *13*--classroom; *14*--instructors' work stations; *15*--lesson leader's work station

The AWU submarine weapon system trainer, which was recently placed into operation at the naval weapons school, is intended to train personnel of submarine control rooms. It includes a mock-up of the control room of the type 206 submarine, a classroom with 21 work stations for the students and four for officer instructors, a large screen with a laser projector and a computer room (Figure 2). The trainer can be used to practice combat operations of submarines against enemy objectives in conditions as close as possible to those of real combat. The computer is used to simulate the enemy's disposition, his tactics, the capabilities of his weapons, and detection and target indication resources. The trainer is used to practice not only the use of the principal detection, target indication and weapon control resources, but also the methods of determining the enemy's location using radar and a periscope. Foreign specialists feel that when a new submarine crew undergoes such training, its skills may be raised to a level that would permit them to do all work aboard a submarine (except for servicing the diving and surfacing system) without ever having been at sea.

The foreign press reports that the command of the West German navy attaches great significance to teaching the crews of ships and submarines with modern trainers making it possible to simulate the enemy's actions in the course of combat, to objectively evaluate the actions of the students and thus to maintain constant control over the personnel's training. Concurrently, in its opinion the use of training resources would not provide the experience that can be acquired only at sea in the course of exercises and combat duty. This is why work with the trainers is treated as an important preparatory stage, and not as a substitute for combat training at sea.

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